



SPLIT-TYPE, HEAT PUMP AIR CONDITIONERS

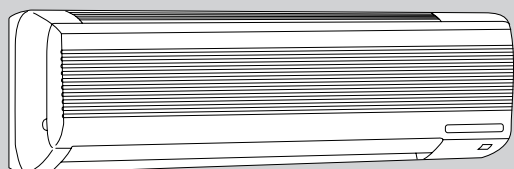
This Service Manual OB206 deals with MS-07/09/12/18/24NV-E1, MU-07/09/12/18/24NV-E1, MS-18NV-E2, and MU-18NV-E2 in OB175 THIRD EDITION issued in June in 1997. Therefore, please refer to OB206, not to OB175 THIRD EDITION, for the above models.

No. OB206

SERVICE MANUAL

Wireless type Models

MS-07NV	- E1 (WH)	▪	MU-07NV	- E1
MS-09NV	- E1 (WH)	▪	MU-09NV	- E1
MS-12NV	- E1 (WH)	▪	MU-12NV	- E1
MS-18NV	- E1 (WH)	▪	MU-18NV	- E1
MS-24NV	- E1 (WH)	▪	MU-24NV	- E1
MS-07NV	- E2 (WH)	▪	MU-07NV	- E2
MS-09NV	- E2 (WH)	▪	MU-09NV	- E2
MS-12NV	- E2 (WH)	▪	MU-12NV	- E2
MS-18NV	- E2 (WH)	▪	MU-18NV	- E2
MS-24NV	- E2 (WH)	▪	MU-24NV	- E2
MS-18NV	- E3 (WH)	▪	MU-18NV	- E3



MS-18NV - E1
MS-24NV - E1
MS-18NV - E2
MS-24NV - E2
MS-18NV - E3



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MS-07NV -^{E1}→MS-07NV -^{E2}

1. Indoor electronic control P.C. board has changed.
However, it is compatible between ^{E1} and ^{E2} models.
2. Auto restart function is added.

MS-09NV -^{E1}→MS-09NV -^{E2}

1. Indoor electronic control P.C. board has changed.
However, it is compatible between ^{E1} and ^{E2} models.
2. Auto restart function is added.
3. Refrigerant filling capacity (R-22) has changed. (900g →850g)

MS-12NV -^{E1}→MS-12NV -^{E2}

1. Indoor electronic control P.C. board has changed.
However, it is compatible between ^{E1} and ^{E2} models.
Auto restart function is added.

MS-18NV -^{E2}→MS-18NV -^{E3}

1. Indoor electronic control P.C. board has changed.
However, it is compatible between ^{E2} and ^{E3} models.
2. Auto restart function is added.

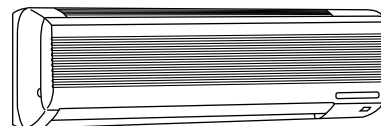
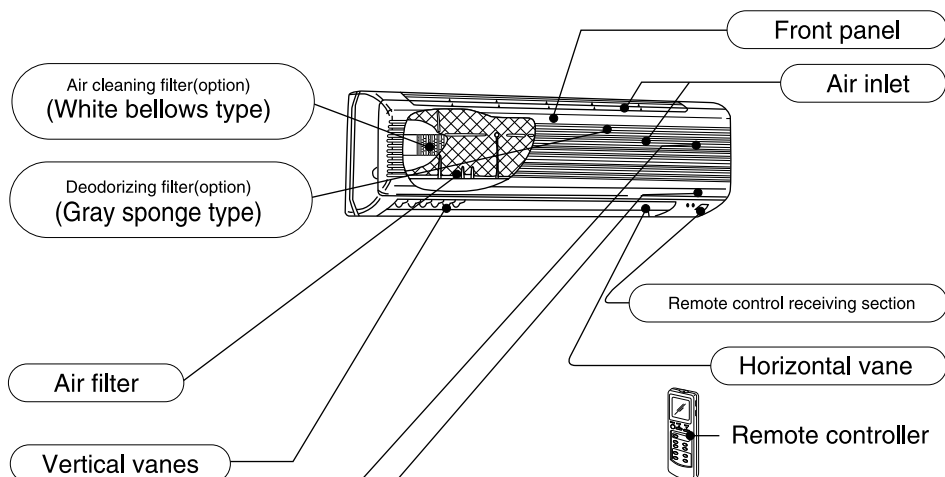
MS-24NV -^{E1}→MS-24NV -^{E2}

1. Indoor electronic control P.C. board has changed.
However, it is compatible between ^{E1} and ^{E2} models.
2. Auto restart function is added.

INDOOR UNIT

MS-07NV -E1 MS-09NV -E1 MS-12NV -E1
 MS-07NV -E2 MS-09NV -E2 MS-12NV -E2

MS-18NV -E1
 MS-24NV -E1
 MS-18NV -E2
 MS-24NV -E2
 MS-18NV -E3



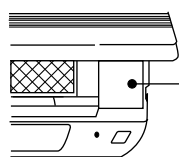
Operation section

Display section

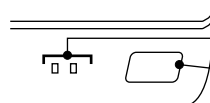
(When the front panel is open)

MS-07NV -E1 MS-09NV -E1 MS-12NV -E1
 MS-07NV -E2 MS-09NV -E2 MS-12NV -E2

MS-07NV -E1 MS-09NV -E1 MS-12NV -E1
 MS-07NV -E2 MS-09NV -E2 MS-12NV -E2



Emergency operation switch

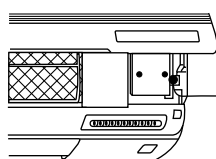


Operation indicator lamp

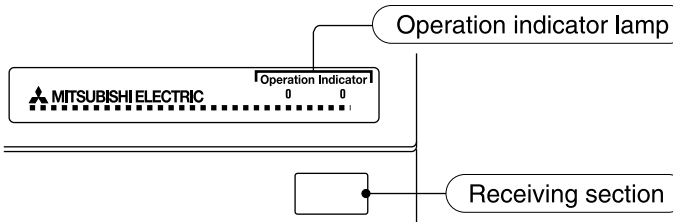
Receiving section

MS-18NV -E1 MS-24NV -E1
 MS-18NV -E2 MS-24NV -E2 MS-18NV -E3

MS-18NV -E1 MS-24NV -E1
 MS-18NV -E2 MS-24NV -E2 MS-18NV -E3



Emergency operation switch



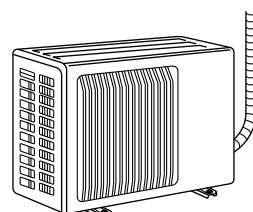
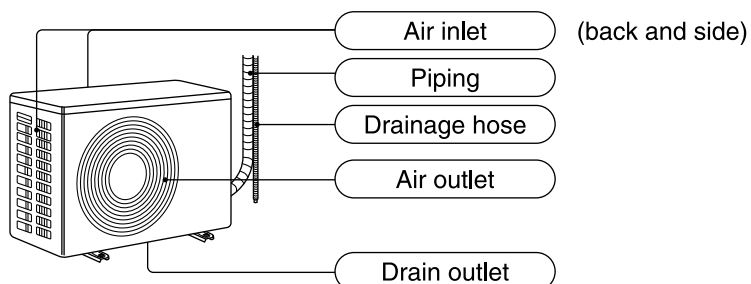
Operation indicator lamp

Receiving section

OUTDOOR UNIT

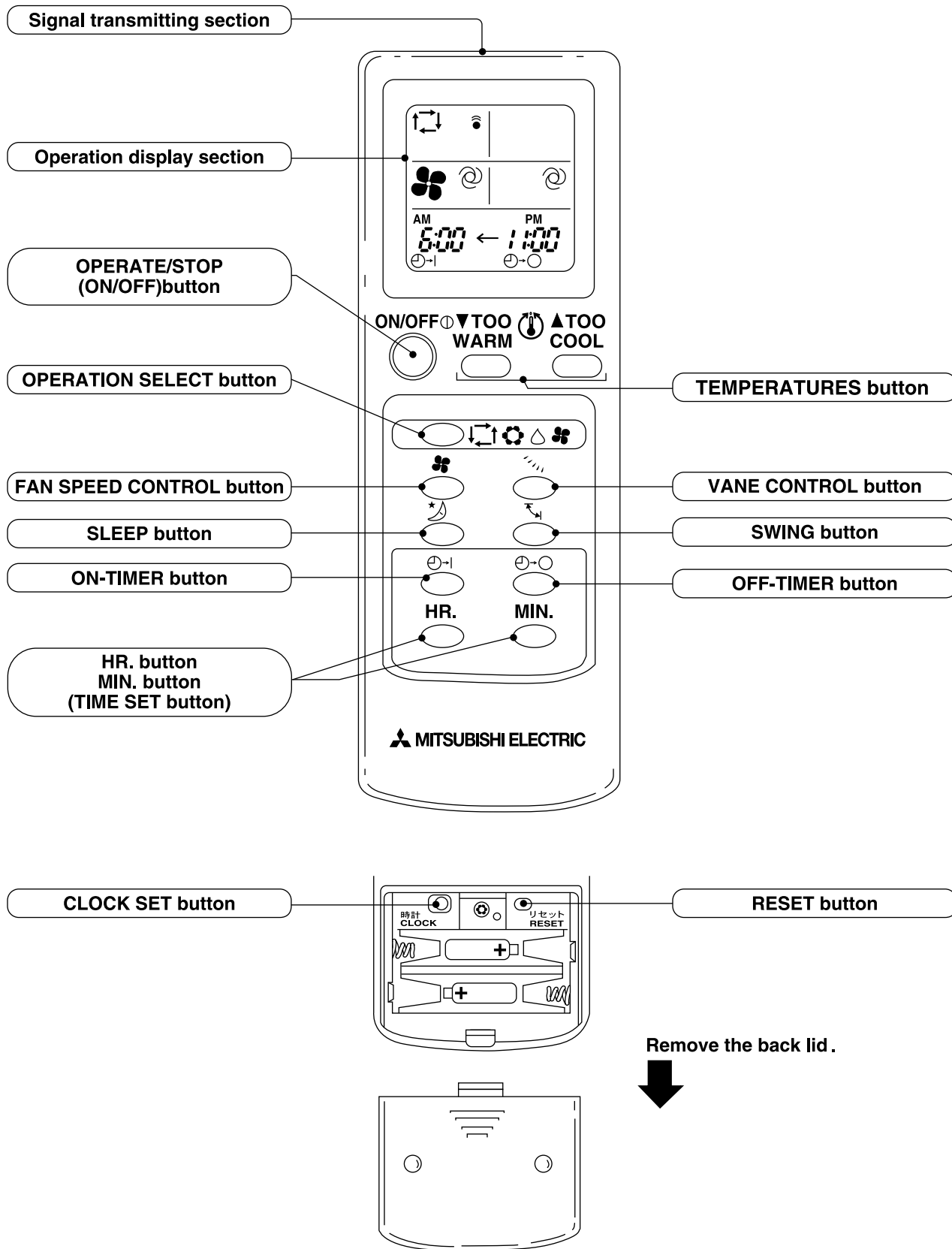
MU-07NV-E1 MU-09NV -E1
 MU-07NV-E2 MU-09NV -E2

MU-12NV -E1 MU-18NV -E1
 MU-24NV -E1 MU-12NV -E2
 MU-18NV -E2 MU-24NV -E2
 MU-18NV -E3



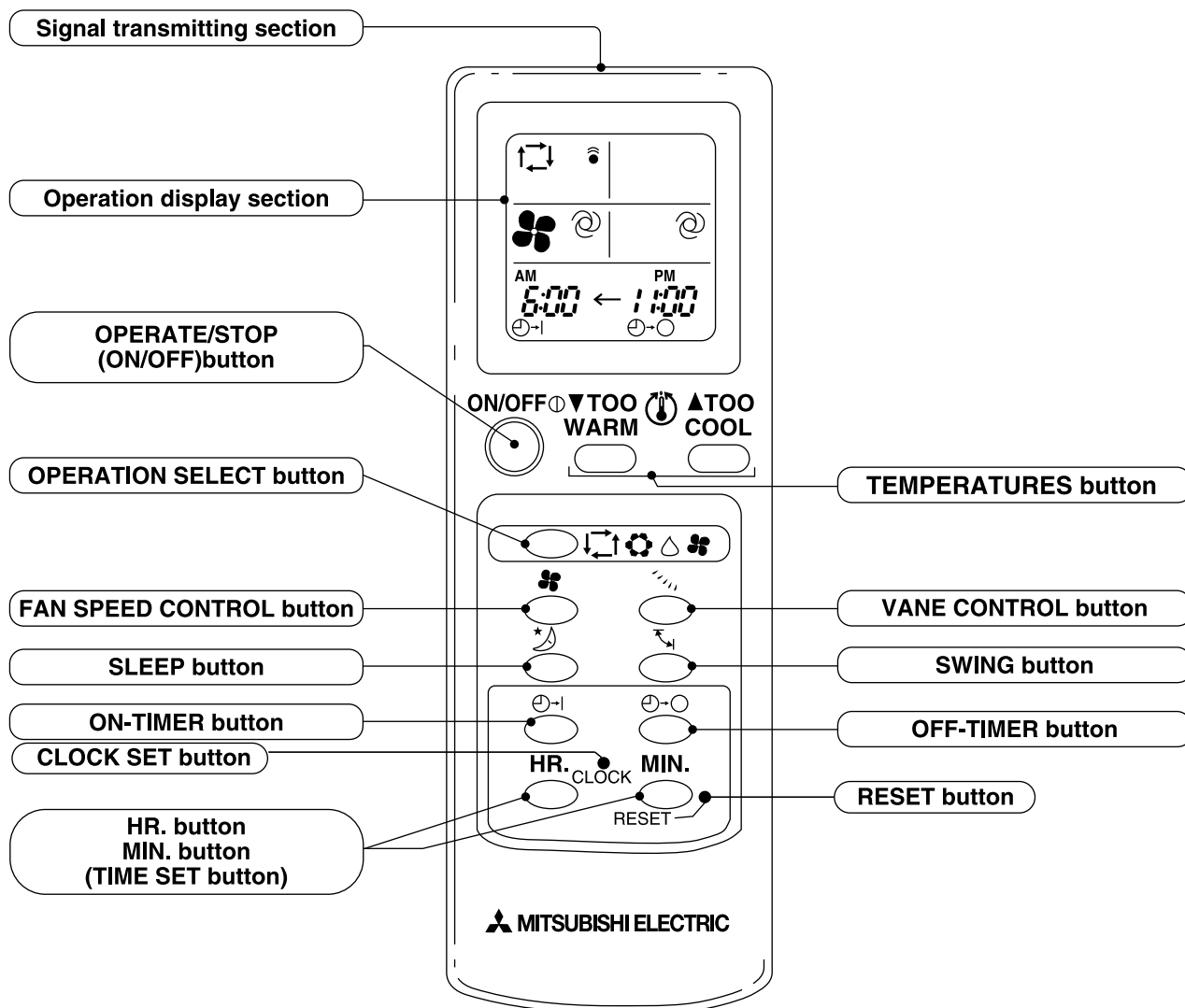
MS-07NV -[E1] MS-09NV -[E1] MS-12NV -[E1]
 MS-18NV -[E1] MS-24NV -[E1] MS-18NV -[E2]

REMOTE CONTROLLER



MS-07NV -[E1] (Product number 7000001T~)
MS-12NV -[E1] (Product number 7000001T~)
MS-07NV -[E2]
MS-12NV -[E2]
MS-24NV -[E2]

MS-09NV -[E1] (Product number 7000001T~)
MS-24NV -[E1] (Product number 7000001T~)
MS-09NV -[E2]
MS-18NV -[E2] (Product number 7000001T~)
MS-18NV -[E3]

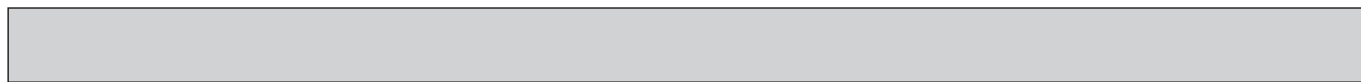


Model				MS-07NV - <div>E1</div> <div>E2</div>		MS-09NV - <div>E1</div>	
Function				Cooling		Cooling	
Power supply				Single phase,220-240V,50Hz			
Capacity	Capacity		kW	2.2		2.5	
	Dehumidification		r/h	0.8		1.1	
	Air flow		m³ /h	INDOOR 492 OUTDOOR 1620			
Electrical data	Power outlet		A	10			
	Running current		A	3.15-3.05		3.60-3.45	
	Power input		W	680-710		780-810	
	Auxiliary heater		A(kW)	—			
	Power factor		%	98-97		98-98	
	Starting current		A	25			
	Compressor motor current		A	2.69-2.59		3.15-2.99	
	Fan motor current		A	INDOOR 0.17 OUTDOOR 0.29			
Coefficient of performance(C.O.P)				3.24-3.10		3.21-3.09	
Compressor	Model			RH-135VGHT		RH-145VGHT	
	Output		W	650		700	
	Winding resistance(at20℃)		Ω	C-R 4.17 C-S 5.75		C-R 4.04 C-S 5.96	
Indoor fan motor	Model			RC4V19-AA			
	Winding resistance(at20℃)		Ω	WHT-BLK292.4 BLK-RED324.6			
Outdoor fan motor	Model			RA6V23-AB			
	Winding resistance(at20℃)		Ω	WHT-BLK268.4 BLK-RED390.8			
Dimensions	Indoor unit	Width	mm	815			
		Height	mm	275			
		Depth	mm	183			
	Outdoor unit	Width	mm	780			
		Height	mm	540			
		Depth	mm	255			
Weight	Indoor unit		kg	8			
	Outdoor unit		kg	32			
Special remarks	Air direction			5			
	Sound level (Hi)	Indoor unit	dB	37			
		Outdoor unit	dB	44-45			
	Fan speed (Hi)	Indoor unit	rpm	1,100			
		Outdoor unit	rpm	740-770			
	Fan speed regulator	Indoor unit		4			
		Outdoor unit		1			
	Refrigerant filling capacity(R-22)		kg	0.65		0.9	
	Thermistor	RT11(at25℃)	kΩ	10			
		RT12(at25℃)	kΩ	10			

NOTE:Test conditions

Cooling : Indoor DB27℃ / WB19℃

Outdoor DB35℃ / WB24℃

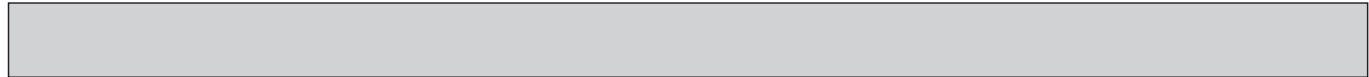


Model				MS-09NV - <div>E2</div>		MS-12NV - <div>E1</div> <div>E2</div>		
Function				Cooling		Cooling		
Power supply				Single phase,220-240V,50Hz				
Capacity	Capacity		kW	2.5		3.5		
	Dehumidification		r/h	1.1		1.6		
	Air flow		m³ /h	INDOOR 492 OUTDOOR 1620		INDOOR 558 OUTDOOR 2190-2304		
Electrical data	Power outlet		A	10				
	Running current		A	3.60-3.45		6.20-6.35		
	Power input		W	780-810		1310-1390		
	Auxiliary heater		A(kW)	—				
	Power factor		%	98-98		96-91		
	Starting current		A	25		35		
	Compressor motor current		A	3.15-2.99		5.66-5.81		
	Fan motor current		A	INDOOR 0.17 OUTDOOR 0.29		INDOOR 0.17 OUTDOOR 0.37		
	Coefficient of performance(C.O.P)				3.21-3.09		2.67-2.52	
Compressor	Model			RH-145VGHT		RH-231VHAT		
	Output		W	700		1,100		
	Winding resistance(at20℃)		Ω	C-R 4.04 C-S 5.96		C-R 2.11 C-S 3.97		
Indoor fan motor	Model			RC4V19-AA				
	Winding resistance(at20℃)		Ω	WHT-BLK292.4 BLK-RED324.6				
Outdoor fan motor	Model			RA6V23-AB		RA6V40-EC or EE		
	Winding resistance(at20℃)		Ω	WHT-BLK268.4 BLK-RED390.8		WHT-BLK130.4 BLK-RED134.6		
Dimensions	Indoor unit	Width	mm	815				
		Height	mm	275				
		Depth	mm	183				
	Outdoor unit	Width	mm	780		850		
		Height	mm	540		605		
		Depth	mm	255		290		
Weight	Indoor unit		kg	8				
	Outdoor unit		kg	32		38		
Special remarks	Air direction			5				
	Sound level (Hi)	Indoor unit	dB	37		42		
		Outdoor unit	dB	44-45		50		
	Fan speed (Hi)	Indoor unit	rpm	1,100		1,230		
		Outdoor unit	rpm	740-770		780-820		
	Fan speed regulator	Indoor unit		4				
		Outdoor unit		1				
	Refrigerant filling capacity(R-22)			kg	0.65		0.8	
	Thermistor	RT11(at25℃)		kΩ	10			
RT12(at25℃)		kΩ	10					

NOTE:Test conditions

Cooling : Indoor DB27℃ / WB19℃

Outdoor DB35℃ / WB24℃



Model				MS-18NV - <div>E1</div> <div>E2</div> <div>E3</div>			MS-24NV - <div>E1</div> <div>E2</div>			
Function				Cooling			Cooling			
Power supply				Single phase,220-240V,50Hz						
Capacity	Capacity		kW	5.1			6.4			
	Dehumidification		ℓ /h	2.5			3.4			
	Air flow		m³ /h	INDOOR 756 OUTDOOR 2190			INDOOR 816 OUTDOOR 2286			
Electrical data	Power outlet		A	15			25			
	Running current		A	9.1			12.9-12.6			
	Power input		W	1,910-2,010			2,780-2,900			
	Auxiliary heater		A(kW)	—						
	Power factor		%	95-92			98-96			
	Starting current		A	51-55			59			
	Compressor motor current		A	8.46			12.06-11.76			
	Fan motor current		A	INDOOR 0.25 OUTDOOR 0.39			INDOOR 0.29 OUTDOOR 0.55			
Coefficient of performance(C.O.P)				2.67-2.54			2.30-2.21			
Compressor	Model			NH-33VMDT			NH-47VMDT			
	Output		W	1,500			2,200			
	Winding resistance(at20℃)		Ω	C-R1.2 C-S 2.7			C-R0.96 C-S 2.07			
Indoor fan motor	Model			RA4V27-EA			RA4V27-EC			
	Winding resistance(at20℃)		Ω	WHT-BLK183.8 BLK-RED250.5						
Outdoor fan motor	Model			RA6V50-OD or OF			RA6V60-AA or AB			
	Winding resistance(at20℃)		Ω	WHT-BLK116.4 BLK-RED111			WHT-BLK81.1 BLK-RED102.2 BLK-YLW 92.2			
Dimensions	Indoor unit	Width	mm	1,015						
		Height	mm	320						
		Depth	mm	190						
	Outdoor unit	Width	mm	850						
		Height	mm	605						
		Depth	mm	290						
Weight	Indoor unit		kg	14						
	Outdoor unit		kg	55			61			
Special remarks	Air direction			5						
	Sound level (Hi)	Indoor unit	dB	42			45			
		Outdoor unit	dB	52			53			
	Fan speed (Hi)	Indoor unit	rpm	1,180			1,260			
		Outdoor unit	rpm	810-845			860-886			
	Fan speed regulator	Indoor unit		4						
		Outdoor unit		1			2			
	Refrigerant filling capacity(R-22)			kg	1.65			2.15		
	Thermistor	RT11(at25℃)	kΩ	10						
		RT12(at25℃)	kΩ	10						

NOTE:Test conditions
Cooling : Indoor DB27℃ / WB19℃
Outdoor DB35℃ / WB24℃

4

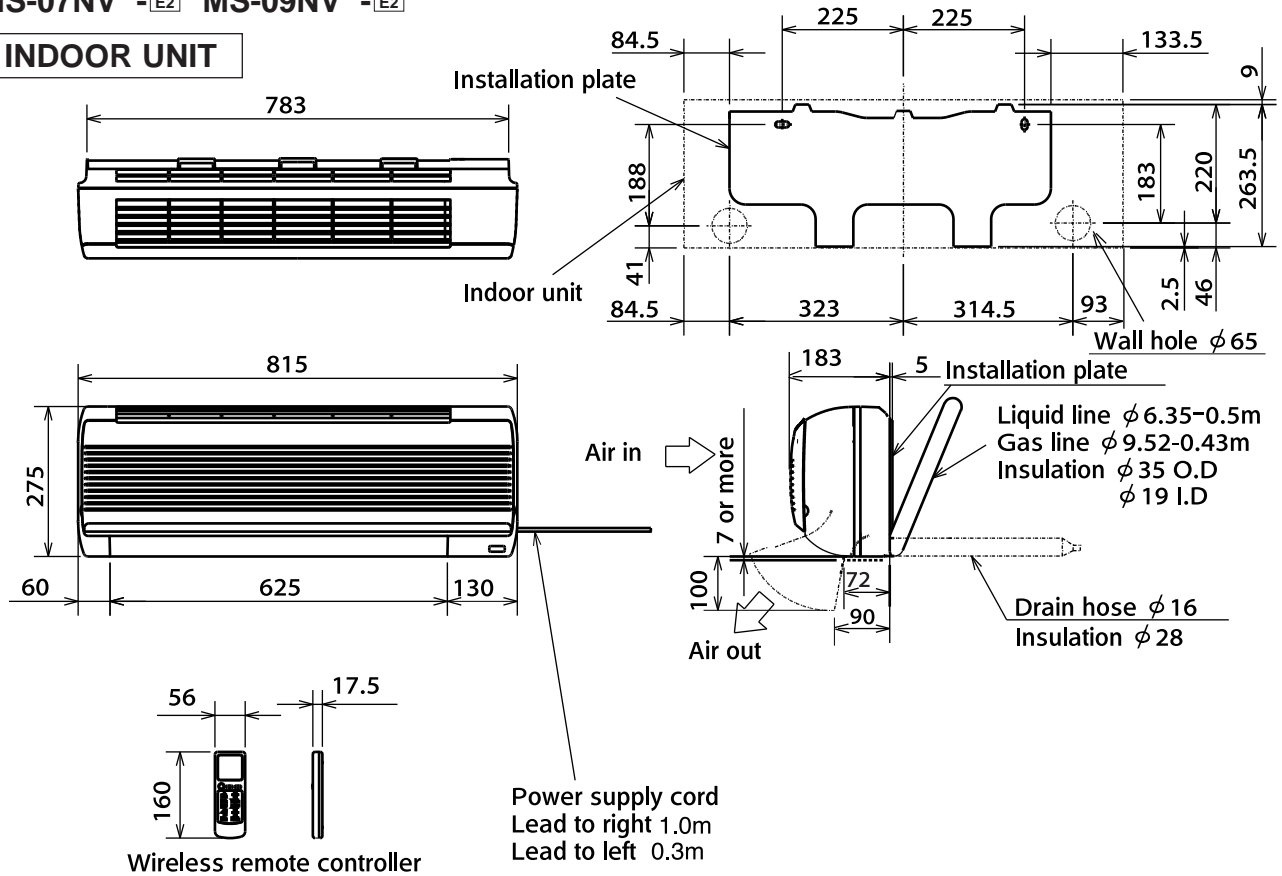
OUTLINES AND DIMENSIONS

MS-07NV -E1 MS-09NV -E1

MS-07NV -E2 MS-09NV -E2

Unit : mm

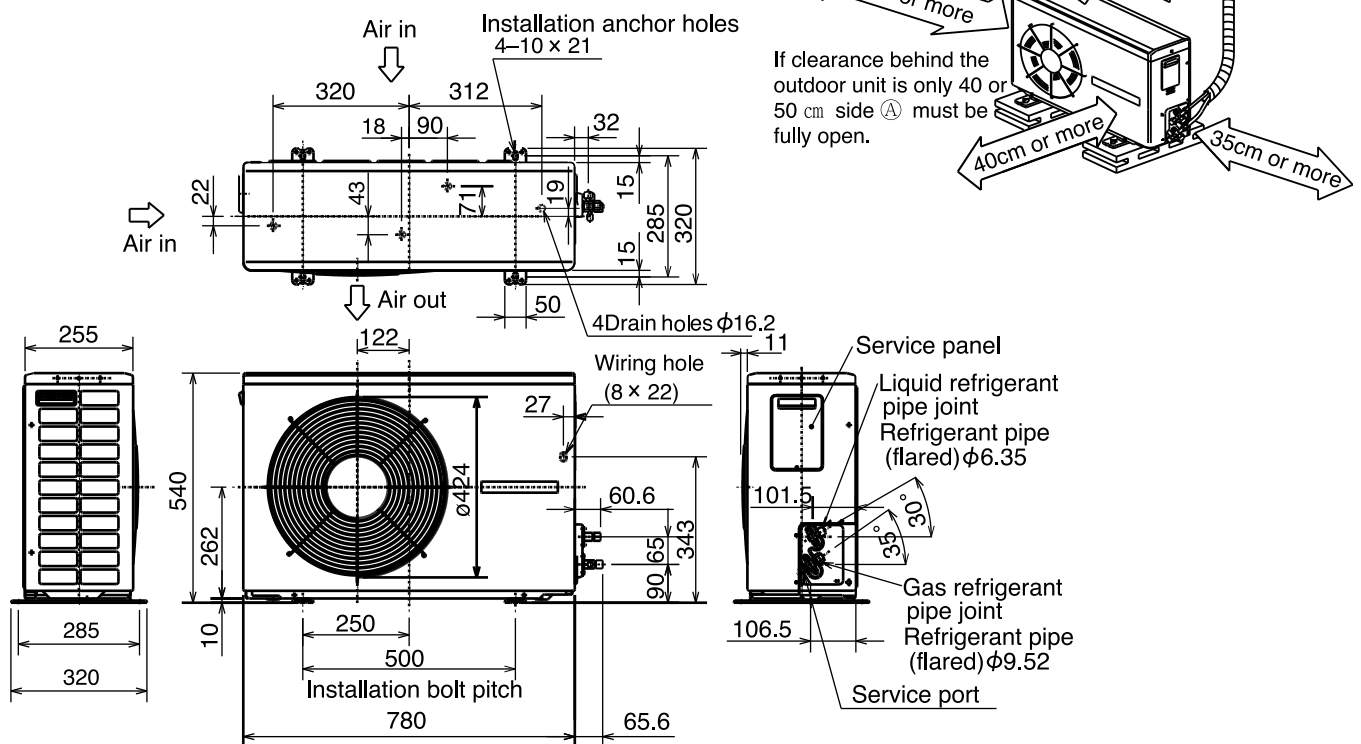
INDOOR UNIT



MU-07NV -E1 MU-09NV -E1

MU-07NV -E2 MU-09NV -E2

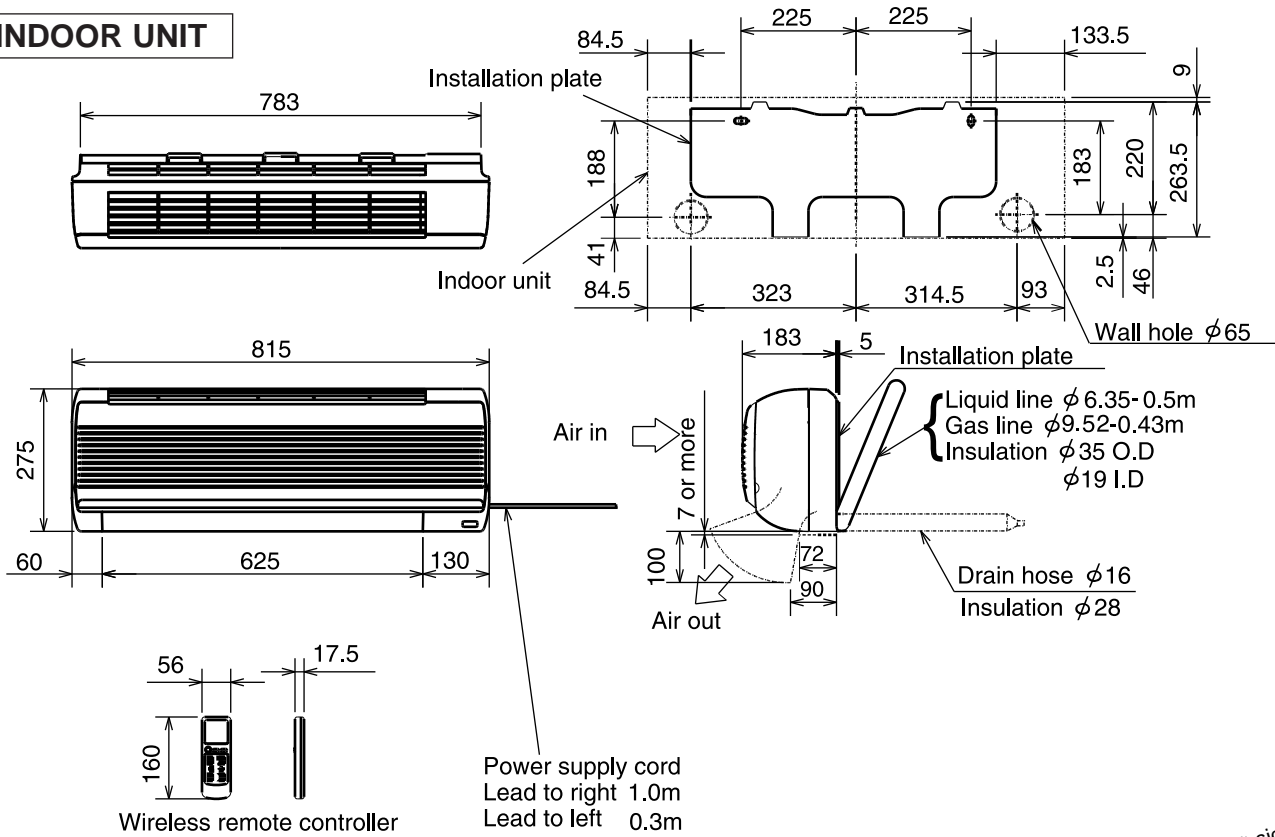
OUTDOOR UNIT



MS-12NV -[E1] MS-12NV -[E2]

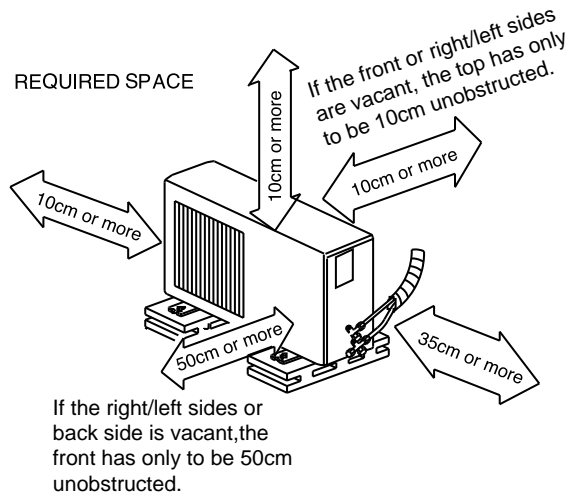
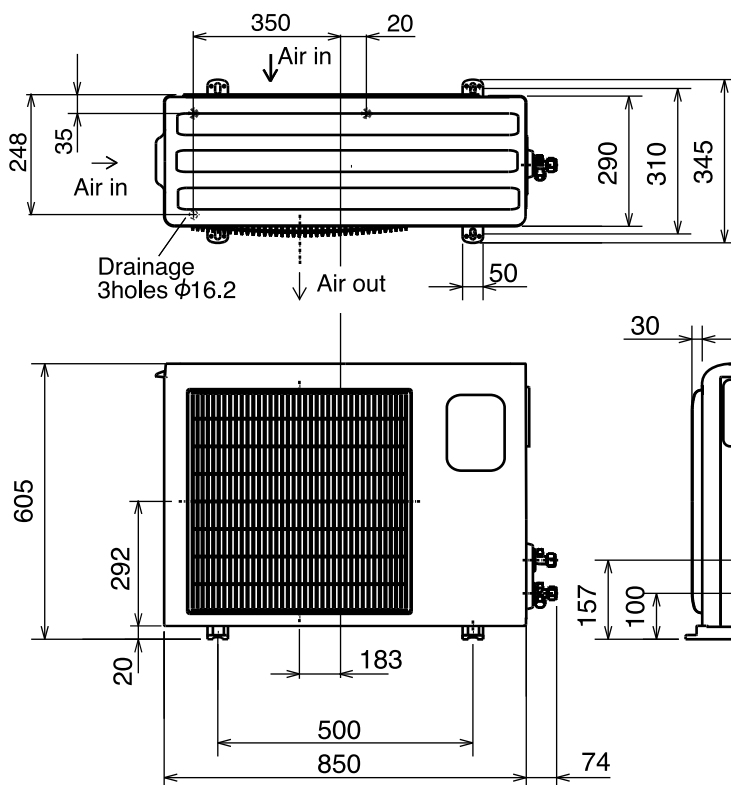
Unit : mm

INDOOR UNIT



MU-12NV -[E1] MU-12NV -[E2]

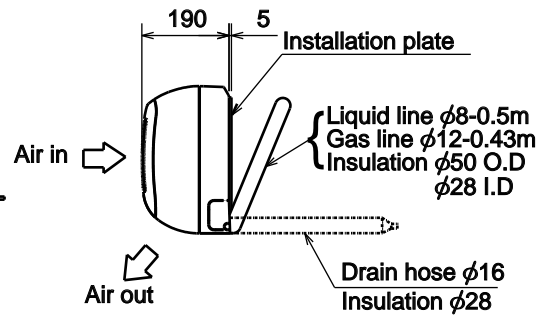
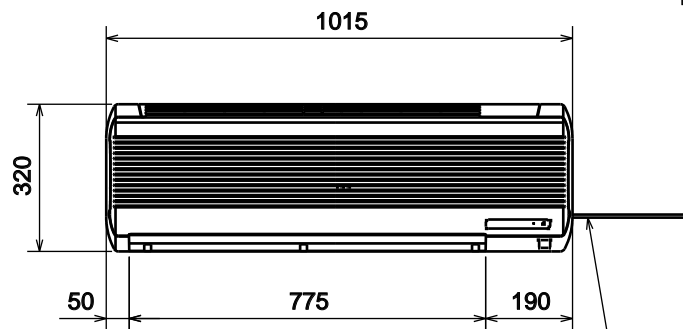
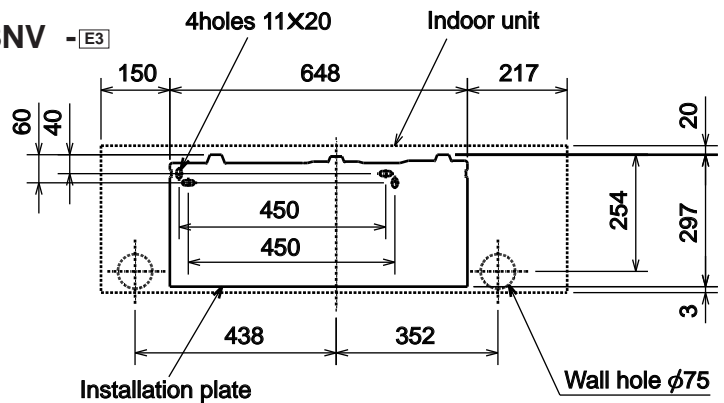
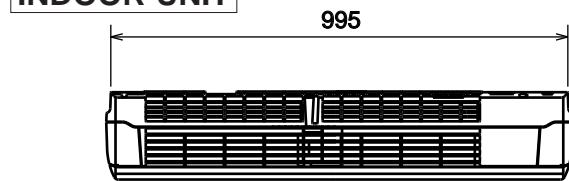
OUTDOOR UNIT



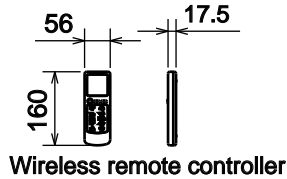
MS-18NV -E1 MS-24NV -E1
MS-18NV -E2 MS-24NV -E2 MS-18NV -E3

Unit : mm

INDOOR UNIT

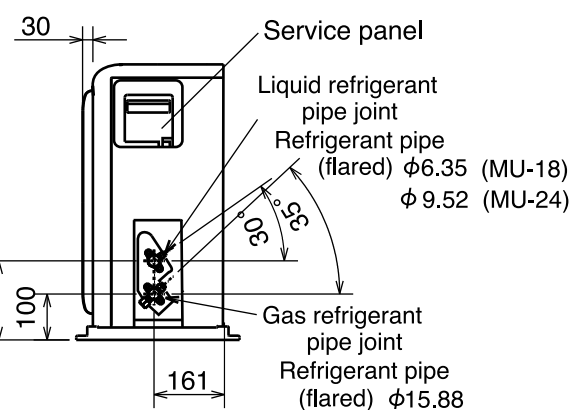
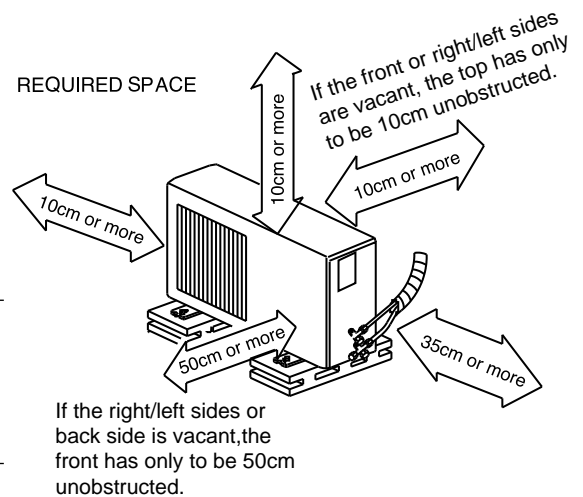
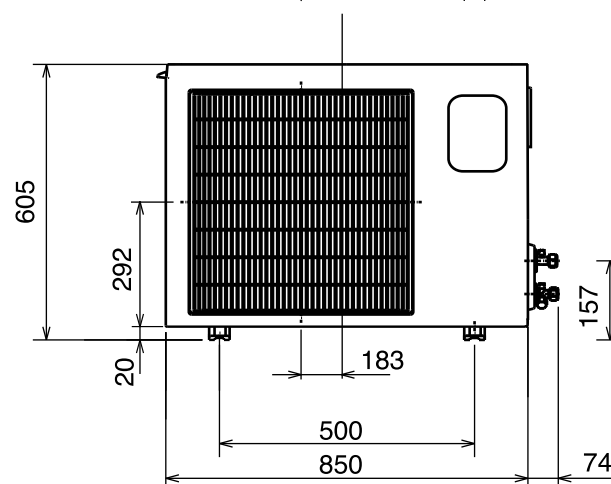
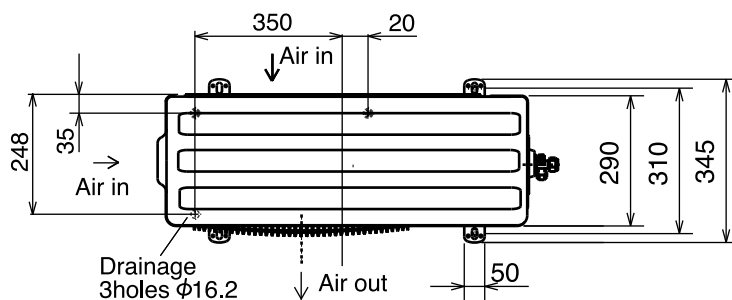


Power supply cord
Lead to right 2m
Lead to left 1m



MU-18NV -E1 MU-24NV -E1
MU-18NV -E2 MU-24NV -E2 MU-18NV -E3

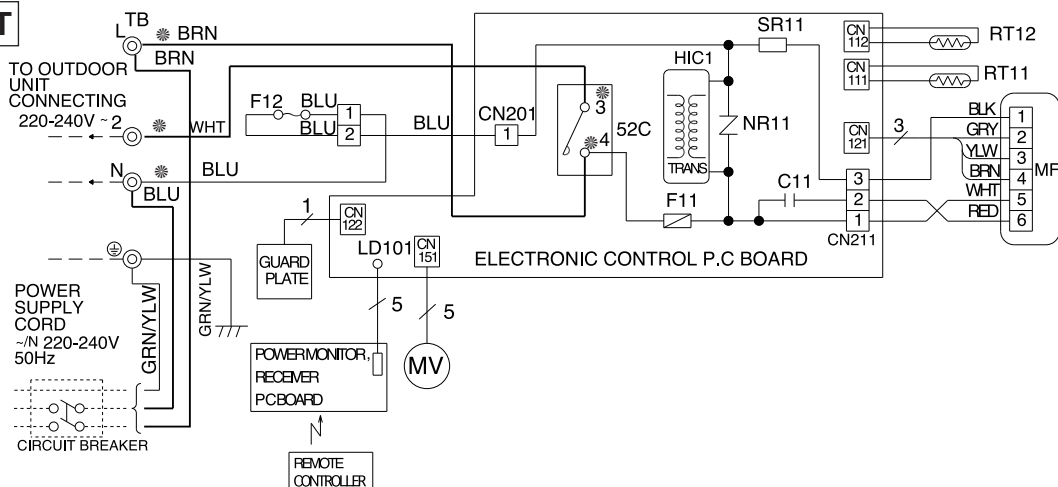
OUTDOOR UNIT



MS-07NV -[E1] MODELS WIRING DIAGRAM

MS-09NV -[E1]

INDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARIATOR	TB	TERMINAL BLOCK
F12	FUSE(93°C)	RT11	ROOM TEMPERATURE THERMISTOR	MV	VANE MOTOR
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	SR11	SOLID STATE RELAY
MF	INDOOR FAN MOTOR	HIC1	DC/DC CONVERTER	52C	CONTACTOR

NOTE:1. For the outdoor electric wiring refer to the outdoor unit electric wiring diagram for servicing.

2. Use copper conductors only.(For field wiring)

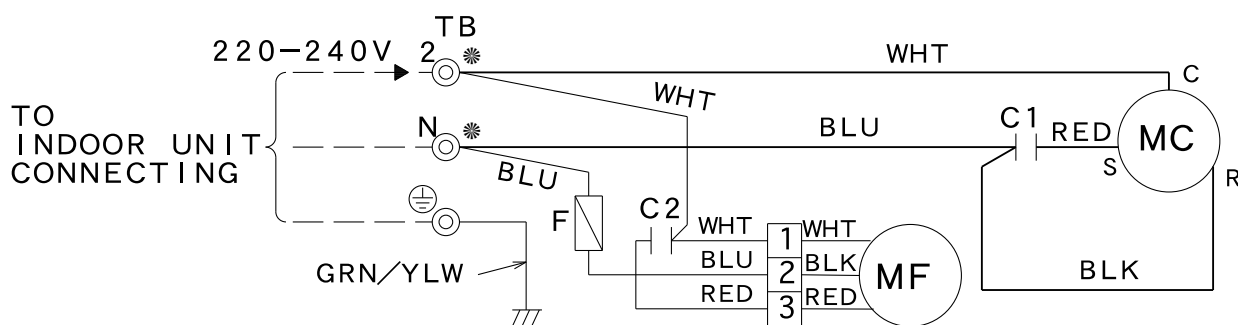
3. Symbols below indicate.

⊙: Terminal block, □□□□: Connector

MU-07NV -[E1] MODELS WIRING DIAGRAM

MU-09NV -[E1]

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	TB	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR (INNER THERMOSTAT)	F	FUSE (2A)

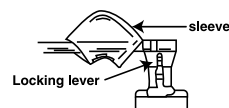
NOTE:1. Use copper conductors only.(For field wiring)

2. "⊙"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.

Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.

3. Symbols below indicate.

⊙: Terminal block, □□□□: Connector

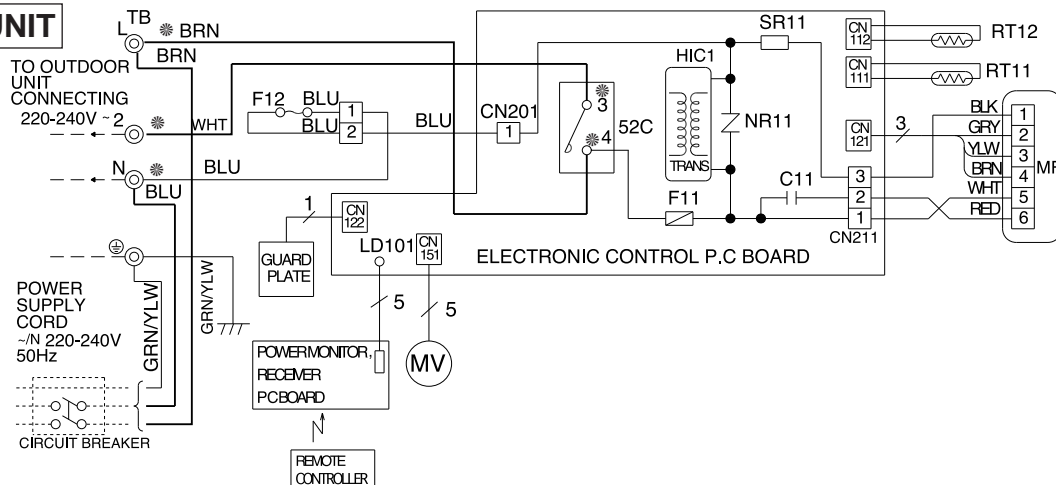


1.Slide the sleeve.

2.Pull the wire while pushing the locking lever.

MS-12NV -[E1] MODEL WIRING DIAGRAM

INDOOR UNIT

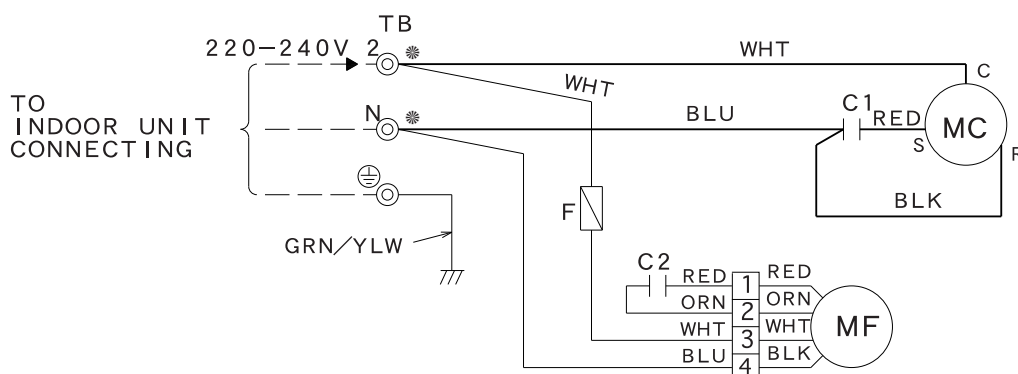


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARIATOR	TB	TERMINAL BLOCK
F12	FUSE(93°C)	RT11	ROOM TEMPERATURE THERMISTOR	MV	VANE MOTOR
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	SR11	SOLID STATE RELAY
MF	INDOOR FAN MOTOR	HIC1	DC/DC CONVERTER	52C	CONTACTOR

NOTE:1. For the outdoor electric wiring refer to the outdoor unit electric wiring diagram for servicing.
 2. Use copper conductors only.(For field wiring)
 3. Symbols below indicate.
 ○: Terminal block, □: Connector

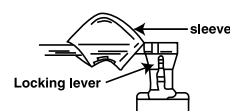
MU-12NV -[E1] MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	TB	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR (INNER THERMOSTAT)	F	FUSE(2A)

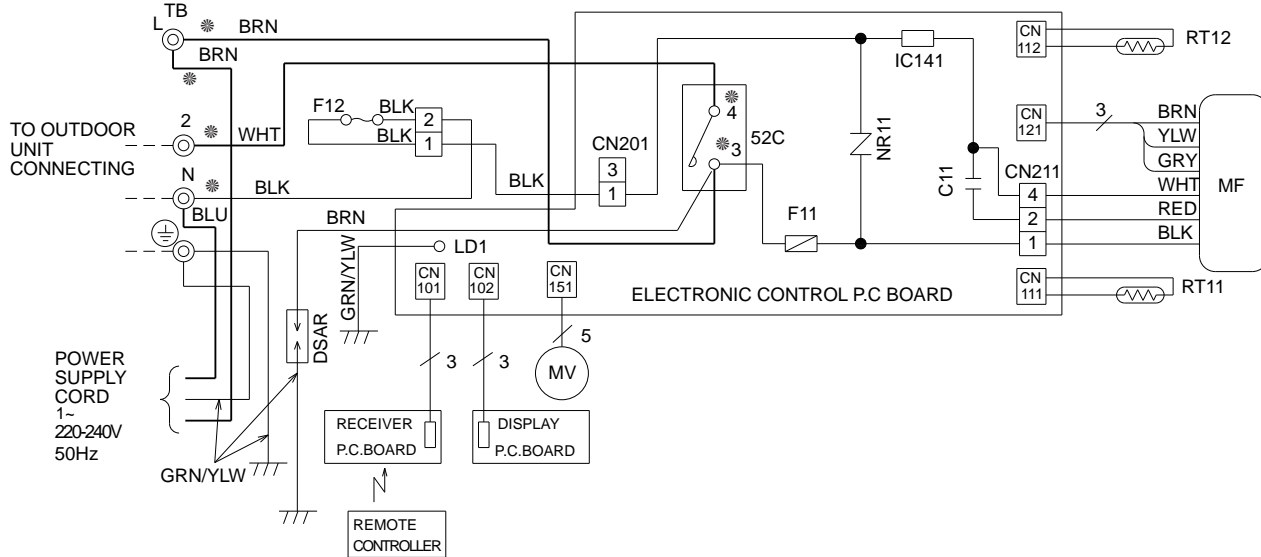
NOTE:1. Use copper conductors only.(For field wiring)
 2. "○" show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
 Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.
 3. Symbols below indicate.
 ○: Terminal block, □: Connector



1. Slide the sleeve.
 2. Pull the wire while pushing the locking lever.

MS-18NV -[E1] MODEL WIRING DIAGRAM

INDOOR UNIT

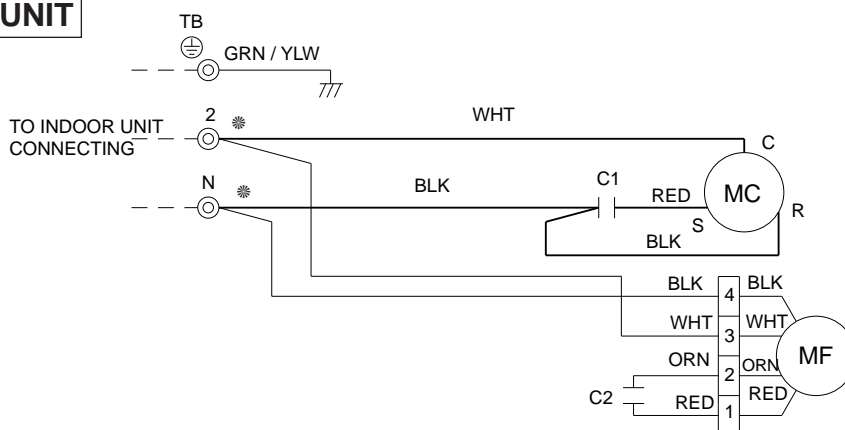


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARISTOR	TB	TERMINAL BLOCK
F12	FUSE(93℃)	RT11	ROOM TEMPERATURE THERMISTOR	DSAR	SURGE ABSORBER
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR		
MF	INDOOR FAN MOTOR	IC141	HYBRID IC		
MV	VANE MOTOR	52C	CONTACTOR		

NOTE:1. For the outdoor electric wiring refer to the outdoor unit electric wiring diagram for servicing.
 2. Use copper conductors only.(For field wiring)
 3. Symbols below indicate.
 ◎: Terminal block, □□□□: Connector

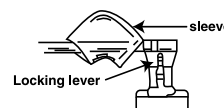
MU-18NV -[E1] MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	TB	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR (INNER THERMOSTAT)	F	FUSE (2A)

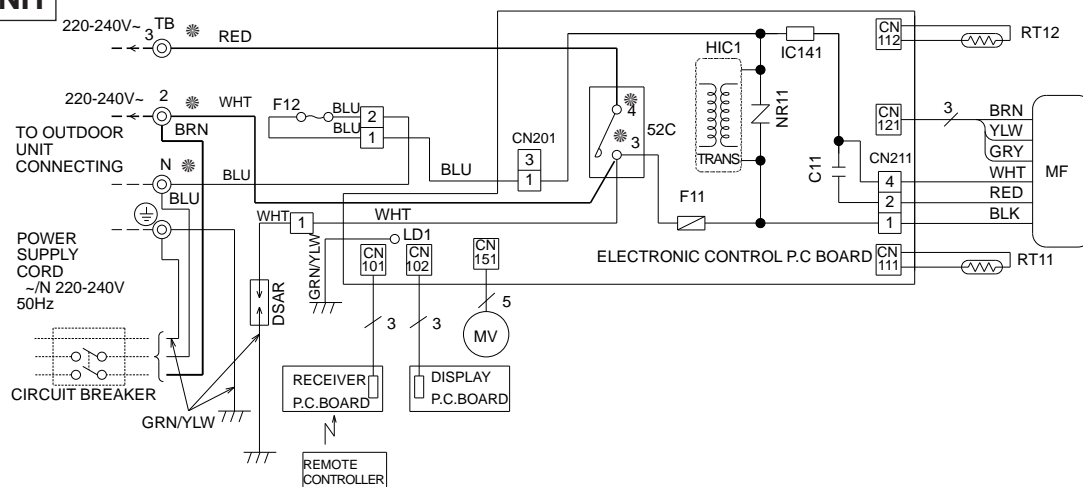
NOTE:1. Use copper conductors only.(For field wiring)
 2. "⊗"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
 Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.
 3. Symbols below indicate.
 ◎: Terminal block, □□□□: Connector



1.Slide the sleeve.
 2.Pull the wire while pushing the locking lever.

MS-24NV -[E1] MODEL WIRING DIAGRAM

INDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARIATOR	TB	TERMINAL BLOCK
F12	FUSE(93°C)	RT11	ROOM TEMPERATURE THERMISTOR	DSAR	SURGE ABSORBER
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	HIC1	DC / DC CONVERTER
MF	INDOOR FAN MOTOR	IC141	HYBRID IC		
MV	VANE MOTOR	52C	CONTACTOR		

NOTE:1. For the outdoor electric wiring refer to the outdoor unit electric wiring diagram for servicing.

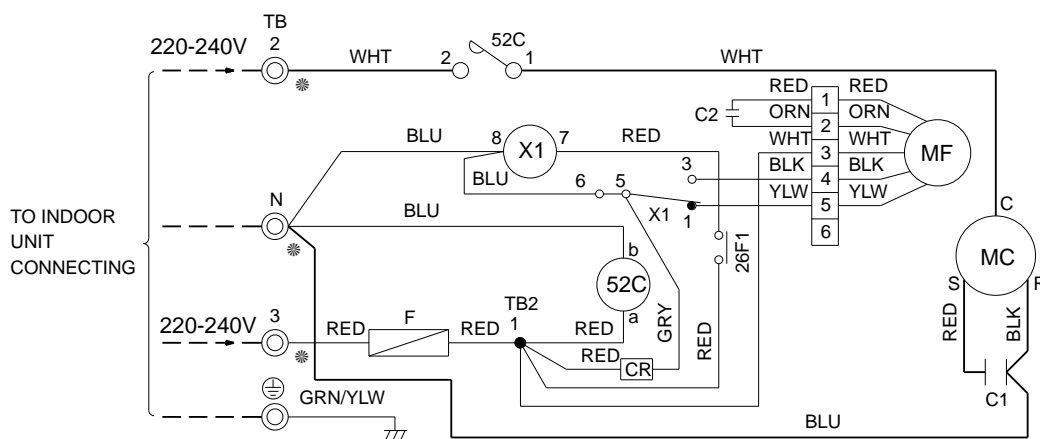
2. Use copper conductors only.(For field wiring)

3. Symbols below indicate.

⊙: Terminal block, □□□□: Connector

MU-24NV -[E1] MODEL WIRING DIAGRAM

OUTDOOR UNIT



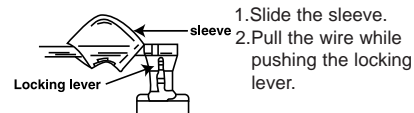
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	TB	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR (INNER THERMOSTAT)	CR	SURGE ABSORBER
X1	FAN MOTOR RELAY	52C	COMPRESSOR CONTACTOR	F	FUSE(2A)

NOTE:1. Use copper conductors only.(For field wiring)

2. "⊙" show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.

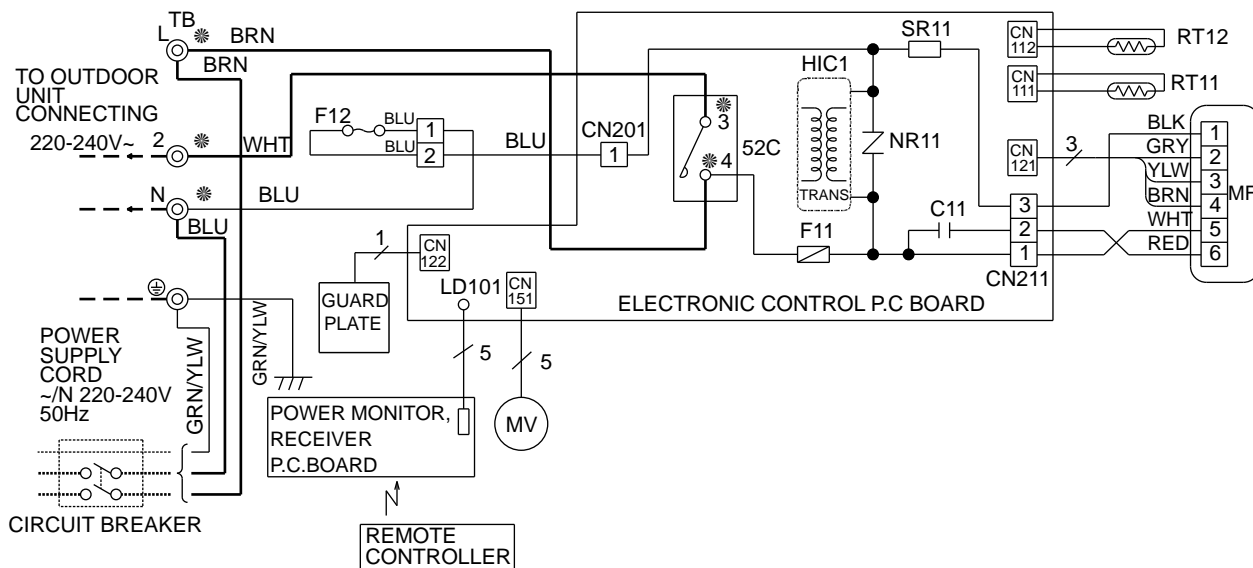
3. Symbols below indicate.

⊙: Terminal block, □□□□: Connector



MS-07NV -E2 MS-09NV -E2 MS-12NV -E2

INDOOR UNIT MODELS WIRING DIAGRAM

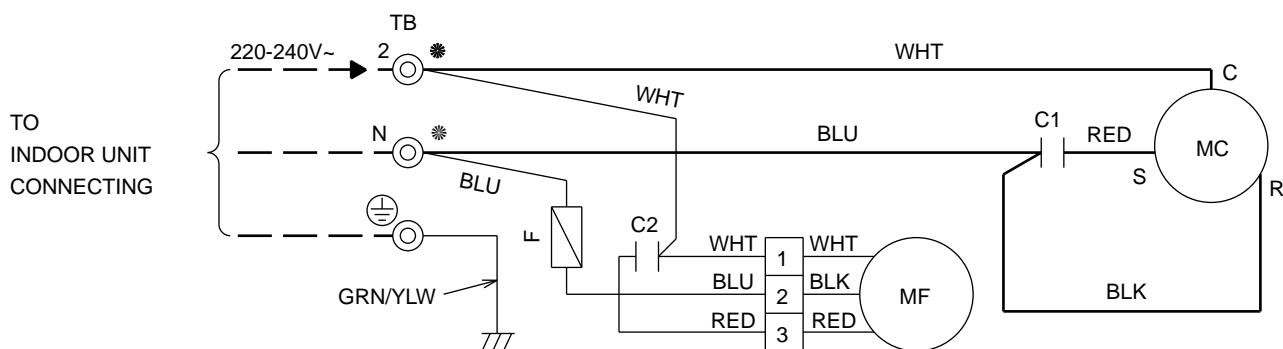


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARIATOR	TB	TERMINAL BLOCK
F12	FUSE(93°C)	RT11	ROOM TEMPERATURE THERMISTOR	MV	VANE MOTOR
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	SR11	SOLID STATE RELAY
MF	INDOOR FAN MOTOR	HIC1	DC/DC CONVERTER	52C	CONTACTOR

NOTE:1. For the outdoor electric wiring refer to the outdoor unit electric wiring diagram for servicing.
 2. Use copper conductors only.(For field wiring)
 3. Symbols below indicate.
 ◎: Terminal block, □□□□: Connector

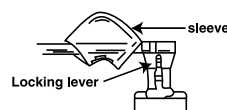
MU-07NV -E2 MU-09NV -E2

OUTDOOR UNIT MODELS WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	TB	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR (INNER THERMOSTAT)	F	FUSE (2A)

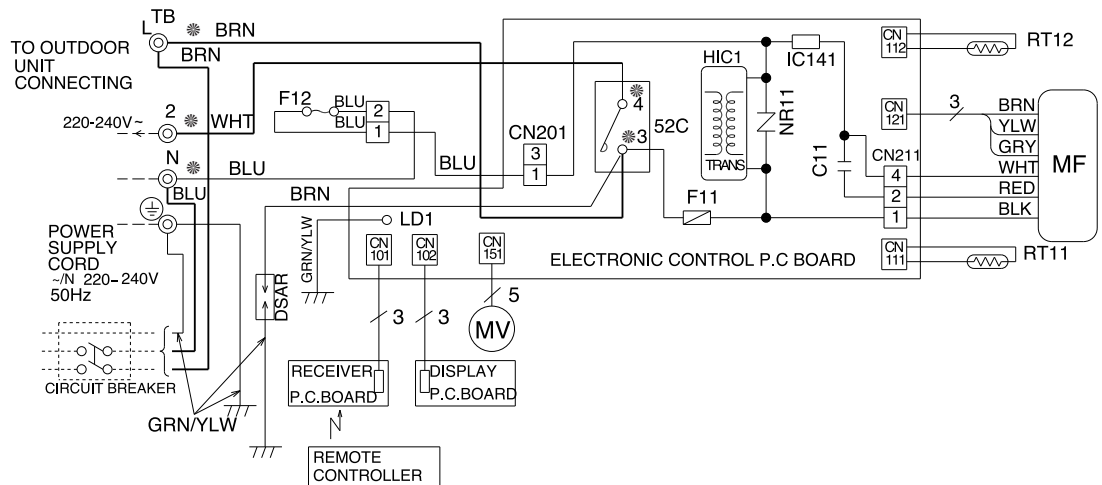
NOTE:1. Use copper conductors only.(For field wiring)
 2. "⊗"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
 Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.
 3. Symbols below indicate.
 ◎: Terminal block, □□□□: Connector



1.Slide the sleeve.
 2.Pull the wire while pushing the locking lever.

MS-18NV -[E2] MODEL WIRING DIAGRAM

INDOOR UNIT

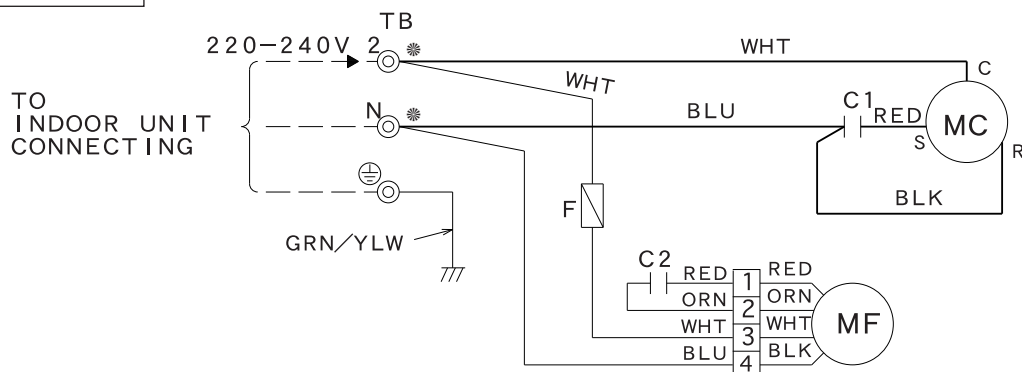


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARIATOR	TB	TERMINAL BLOCK
F12	FUSE(93°C)	RT11	ROOM TEMPERATURE THERMISTOR	DSAR	SURGE ABSORBER
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	HIC1	DC / DC CONVERTER
MF	INDOOR FAN MOTOR	IC141	HYBRID IC		
MV	VANE MOTOR	52C	CONTACTOR		

NOTE:1. For the outdoor electric wiring refer to the outdoor unit electric wiring diagram for servicing.
 2. Use copper conductors only.(For field wiring)
 3. Symbols below indicate.
 ◎: Terminal block, □□□□: Connector

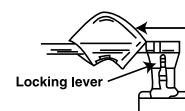
MU-18NV -[E2] MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	TB	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR (INNER THERMOSTAT)	F	FUSE(2A)

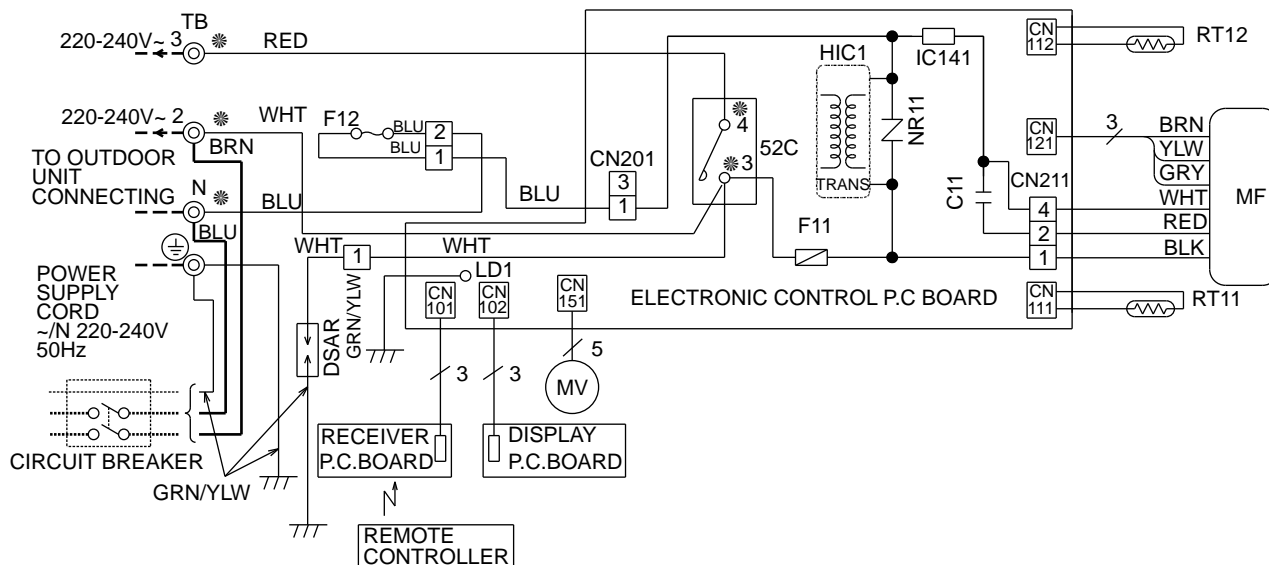
NOTE:1. Use copper conductors only.(For field wiring)
 2. "⊕" show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
 Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.
 3. Symbols below indicate.
 ◎: Terminal block, □□□□: Connector



1. Slide the sleeve.
 2. Pull the wire while pushing the locking lever.

MS-24NV -[E2] MODEL WIRING DIAGRAM

INDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARIATOR	TB	TERMINAL BLOCK
F12	FUSE(93°C)	RT11	ROOM TEMPERATURE THERMISTOR	DSAR	SURGE ABSORBER
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	HIC1	DC / DC CONVERTER
MF	INDOOR FAN MOTOR	IC141	HYBRID IC		
MV	VANE MOTOR	52C	CONTACTOR		

NOTE:1. For the outdoor electric wiring refer to the outdoor unit electric wiring diagram for servicing.

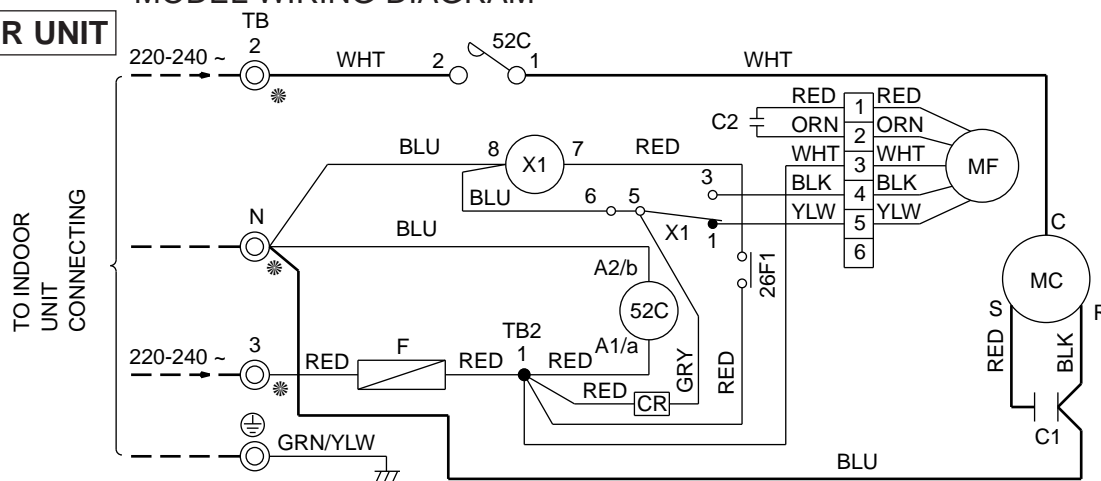
2. Use copper conductors only.(For field wiring)

3. Symbols below indicate.

⊙: Terminal block, □□□□: Connector

MU-24NV -[E2] MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	TB	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR (INNER THERMOSTAT)	CR	SURGE ABSORBER
X1	FAN MOTOR RELAY	52C	COMPRESSOR CONTACTOR	F	FUSE(2A)
TB2	TERMINAL BLOCK	26F1	THERMAL READ SWITCH		

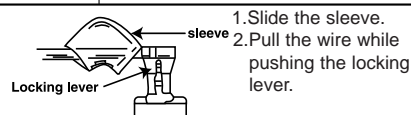
NOTE:1. Use copper conductors only.(For field wiring)

2. "⊙"show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.

Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.

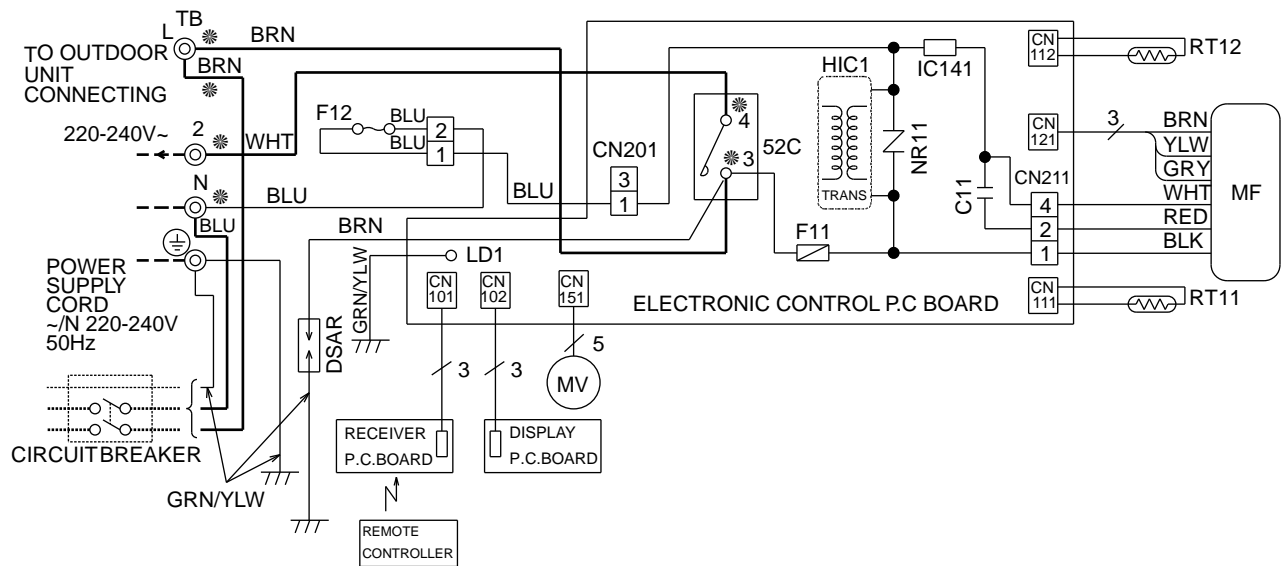
3. Symbols below indicate.

⊙: Terminal block, □□□□: Connector



MS-18NV -[E3] MODEL WIRING DIAGRAM

INDOOR UNIT

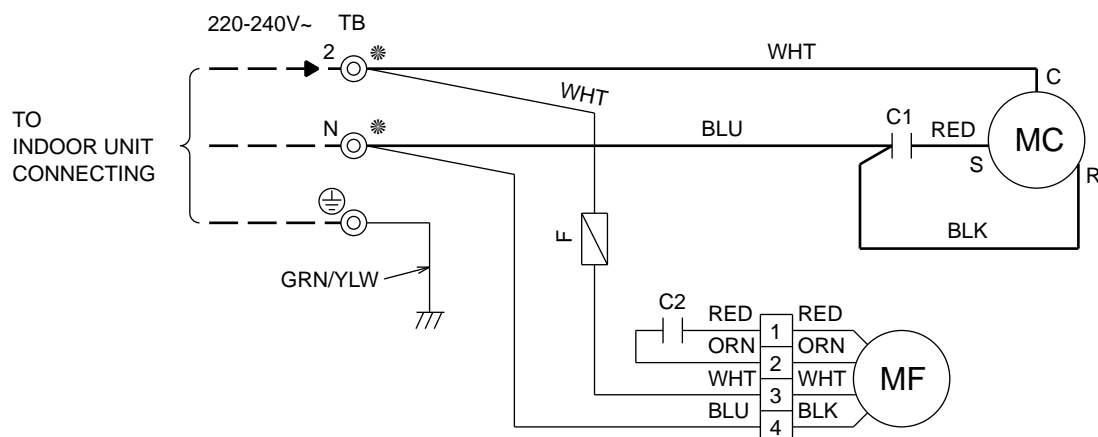


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARIATOR	TB	TERMINAL BLOCK
F12	FUSE(93°C)	RT11	ROOM TEMPERATURE THERMISTOR	DSAR	SURGE ABSORBER
F11	FUSE(3.15A)	RT12	INDOOR COIL THERMISTOR	HIC1	DC / DC CONVERTER
MF	INDOOR FAN MOTOR	IC141	HYBRID IC		
MV	VANE MOTOR	52C	CONTACTOR		

NOTE:1. For the outdoor electric wiring refer to the outdoor unit electric wiring diagram for servicing.
 2. Use copper conductors only.(For field wiring)
 3. Symbols below indicate.
 ○: Terminal block, □□□□: Connector

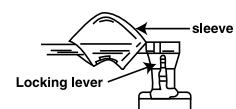
MU-12NV -[E2] MU-18NV -[E3]

OUTDOOR UNIT MODELS WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR	TB	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR (INNER THERMOSTAT)	F	FUSE(2A)

NOTE:1. Use copper conductors only.(For field wiring)
 2. "※" show the terminals with a lock mechanism, so they cannot be removed when you pull the lead wire.
 Be sure to pull the wire by pushing the locking lever(projected part) of the terminal with a finger.
 3. Symbols below indicate.
 ○: Terminal block, □□□□: Connector



1. Slide the sleeve.
 2. Pull the wire while pushing the locking lever.

Unit:mm

MS-07NV -[E1]

MS-09NV -[E1]

MU-07NV -[E1]

MU-09NV -[E1]

MS-07NV -[E2]

MS-09NV -[E2]

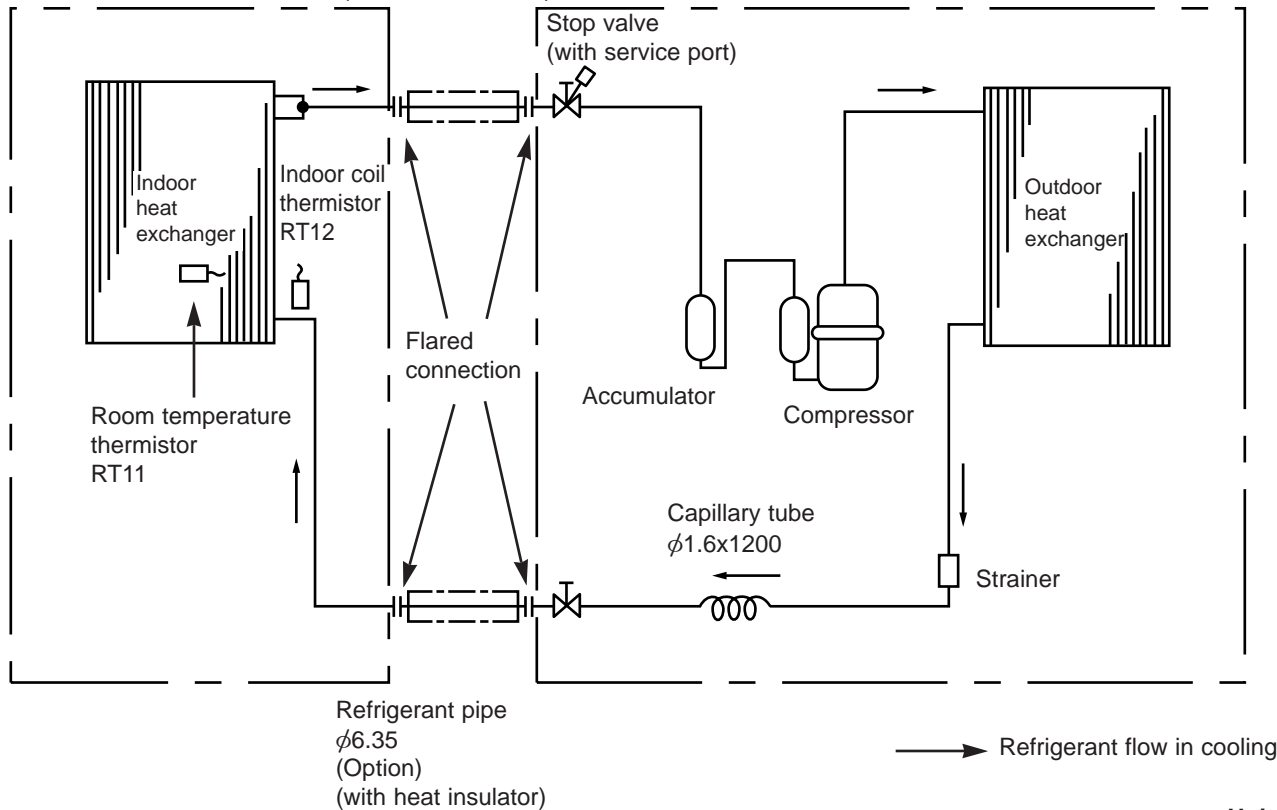
MU-07NV -[E2]

MU-09NV -[E2]

INDOOR UNIT

Refrigerant pipe $\phi 9.52$
(Option)
(with heat insulator)

OUTDOOR UNIT



Unit:mm

MS-12NV -[E1]

MS-12NV -[E2]

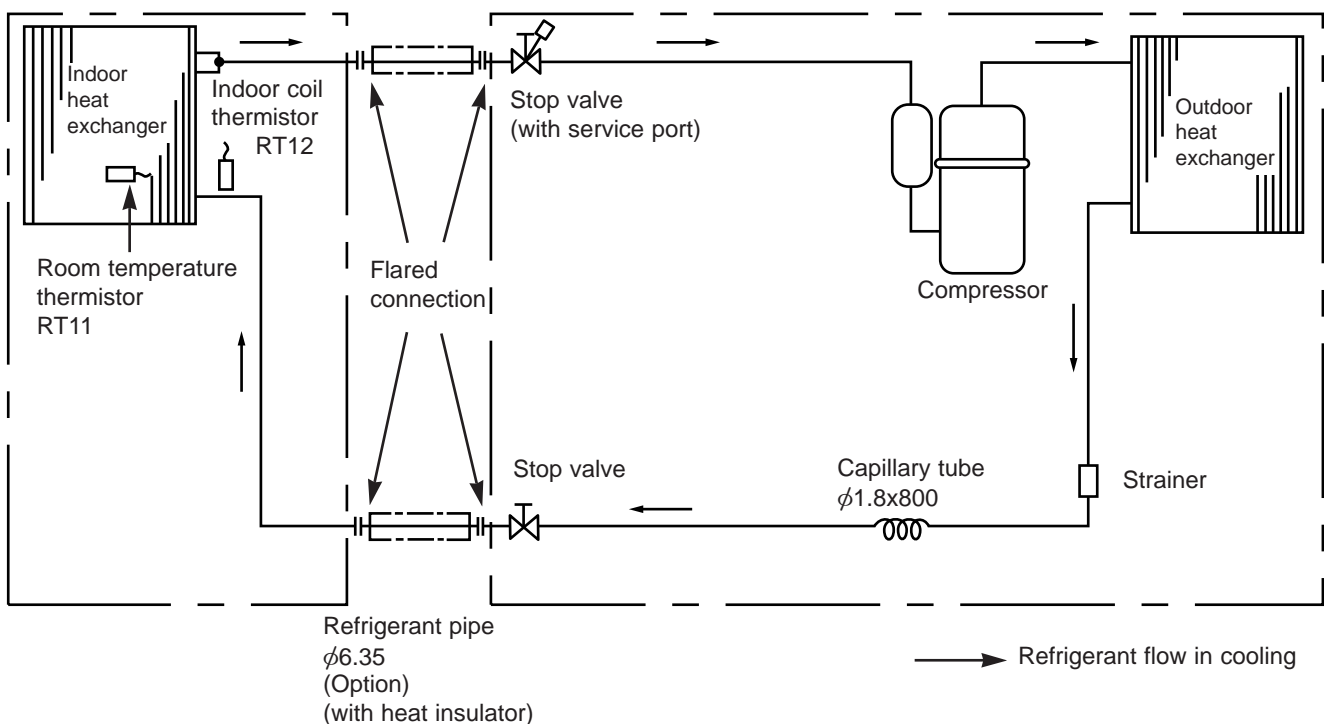
MU-12NV -[E1]

MU-12NV -[E2]

INDOOR UNIT

Refrigerant pipe $\phi 12.7$
(Optional)
(with heat insulator)

OUTDOOR UNIT



MS-18NV -[E1]
MS-18NV -[E3]

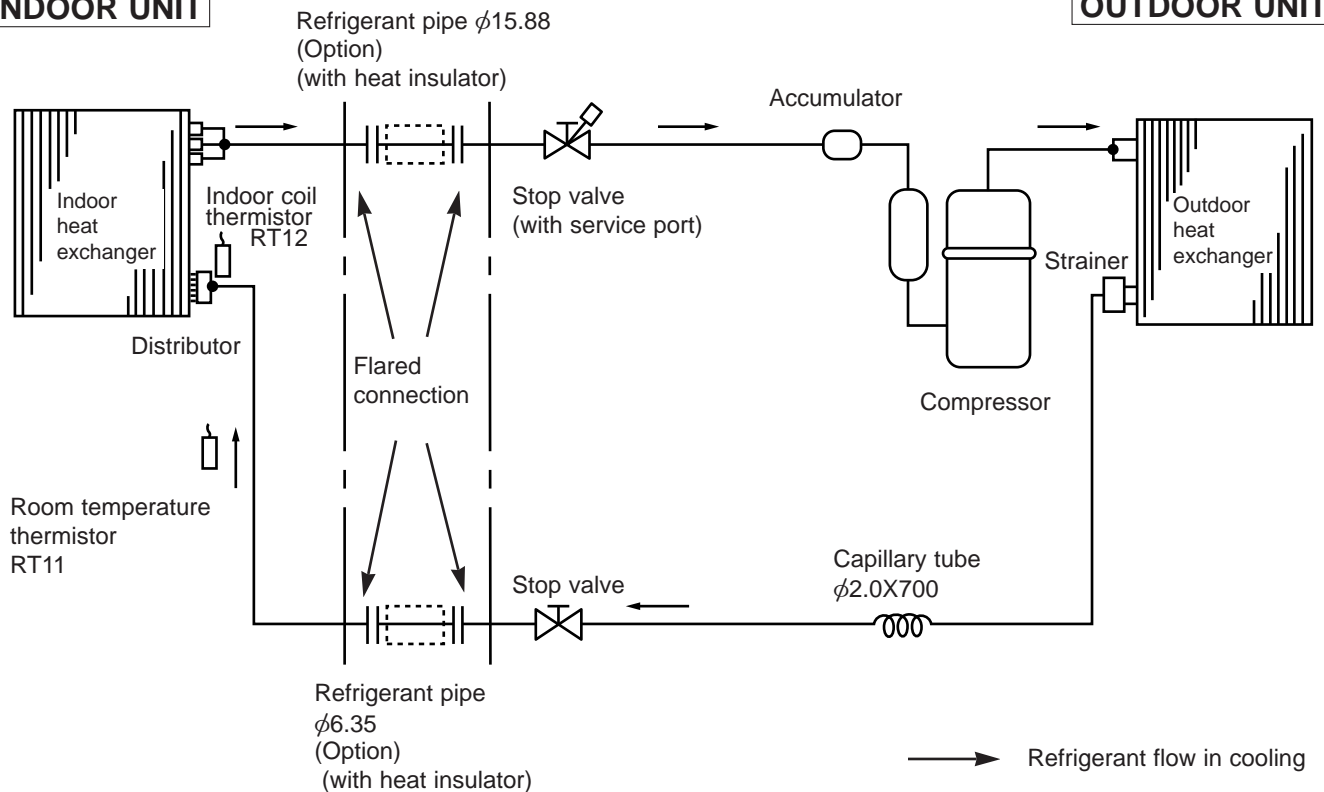
MS-18NV -[E2]

MU-18NV -[E1]
MU-18NV -[E3]

Unit:mm
MU-18NV -[E2]

INDOOR UNIT

OUTDOOR UNIT



MS-24NV -[E1]

MS-24NV -[E2]

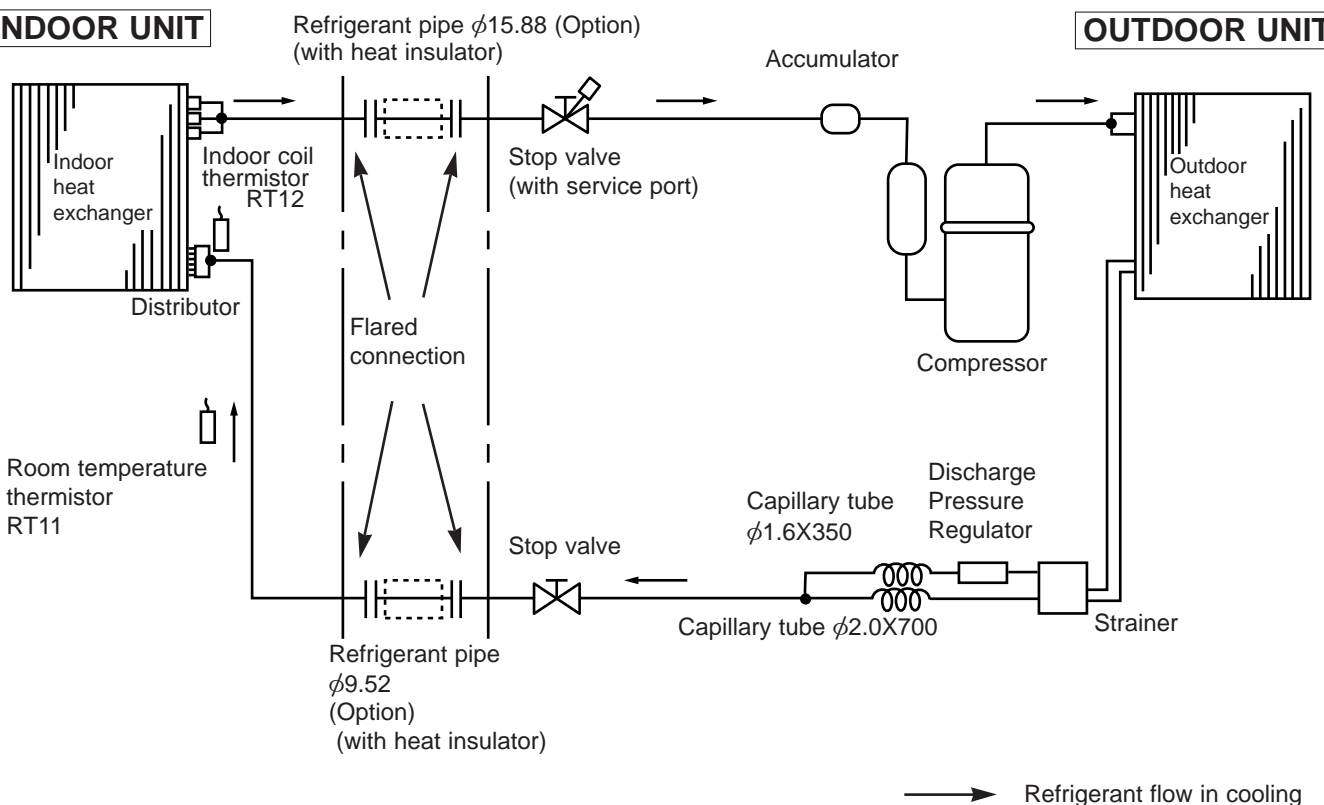
MU-24NV -[E1]

MU-24NV -[E2]

Unit:mm

INDOOR UNIT

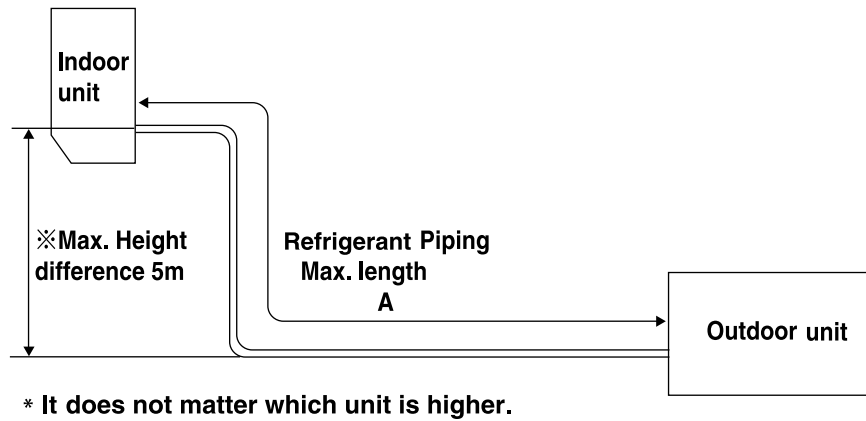
OUTDOOR UNIT



MAX. REFRIGERANT PIPING LENGTH

Model	Refrigerant piping Max. length : m A	Piping size O.D : mm		Length of connecting pipe : m	
		Gas	Liquid	Indoor unit	Outdoor unit
MS-07NV - E1 MS-07NV - E2 MS-09NV - E1 MS-09NV - E2	10	9.52	6.35	0.43	0
MS-12NV - E1 MS-12NV - E2	15	12.7			
MS-18NV - E1 MS-18NV - E2 MS-18NV - E3		15.88	9.52		
MS-24NV - E1 MS-24NV - E2					

MAX. HEIGHT DIFFERENCE



ADDITIONAL REFRIGERANT CHARGE(R-22 : g)

Model	Outdoor unit precharged (up to 7m)	Refrigerant piping length (one way)		
		7m	10m	15m
MS-07NV - E1 MS-07NV - E2	650	0	45	
MS-09NV - E1 MS-09NV - E2	900 850			
MS-12NV - E1 MS-12NV - E2	800			120
MS-18NV - E1 MS-18NV - E2 MS-18NV - E3	1650			
MS-24NV - E1 MS-24NV - E2	2150			

Calculation : $Xg = 15g/m \times (A - 7)m$

EVACUATION PROCEDURES(AIR PURGE)

Connect the refrigerant pipes (both the liquid and gas pipes) between the indoor and the outdoor units.

Remove the service port cap of the stop valve on the side of the outdoor unit gas pipe (The stop valve will not work in its initial state fresh out of the factory (totally closed with cap on)).

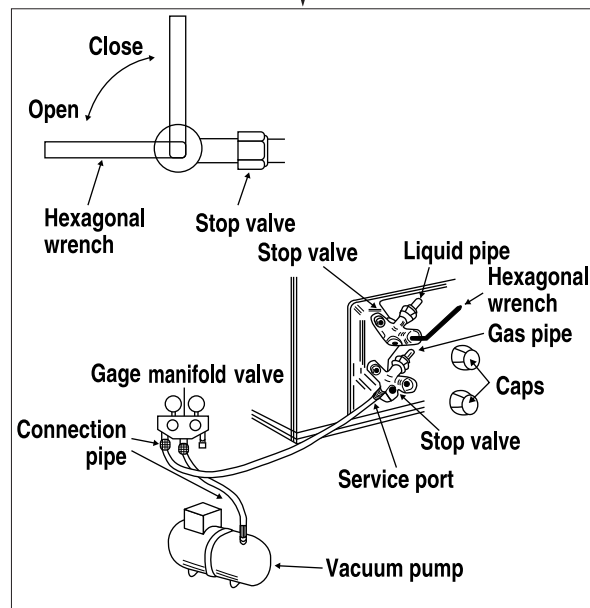
When vacuuming

Connect the gage manifold valve and the vacuum pump to the service port of the stop valve on the liquid pipe side of the outdoor unit.

Run the vacuum pump for more than 15 minutes and at this time confirm that the pressure gage indicates 0.1 Mpa.

Check the vacuum with the gage manifold valve, then close the gage manifold valve, and stop the vacuum pump.

Leave it as is for one or two minutes. Make sure the pointer of the gage manifold valve remains in the same position.



Remove the gage manifold valve quickly from the service port of the stop valve.

After refrigerant pipes are connected and evacuated, fully open all stop valves on gas and liquid pipe sides. Operating without fully opening lowers the performance and causes trouble.

Pipe length :
7m maximum
No gas charge
is needed.

Pipe length
exceeding 7m
Charge the prescribed
amount of gas.

Tighten the cap to the service port to obtain the initial status.

Retighten the cap.

Leak test

The standard data contained in these specifications apply only to the operation of the air conditioner under normal conditions. Since operating conditions vary according to the areas where these units are installed. The following information has been provided to clarify the operating characteristics of the air conditioner under the conditions indicated by the performance curve.

(1) GUARANTEED VOLTAGE

Rated voltage : $\pm 10\%$ (198 ~ 264V), 50Hz

(2) AIR FLOW

Air flow should be set at MAX.

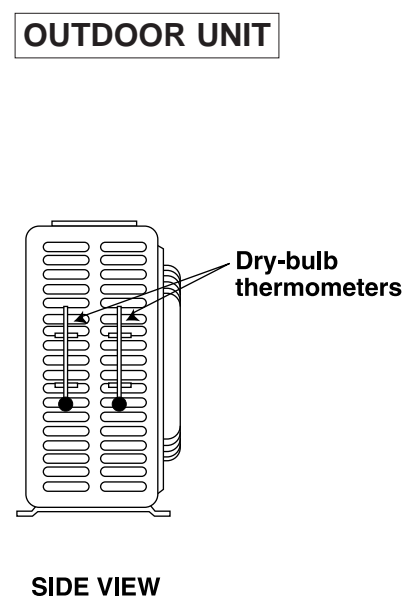
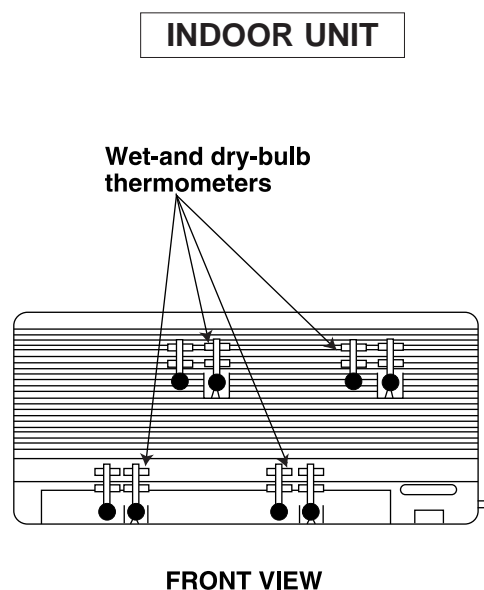
(3) MAIN READINGS

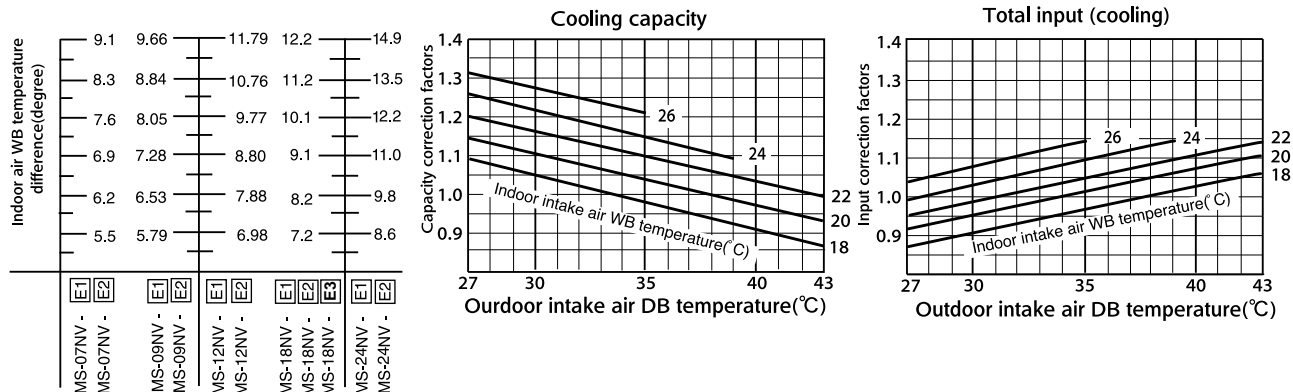
(1) Indoor intake air wet-bulb temperature	:°CWB	} Cooling
(2) Indoor outlet air wet-bulb temperature	:°CWB	
(3) Outdoor intake air dry-bulb temperature	:°CDB	
(4) Total input	:W	

Indoor air wet-bulb temperature difference on the left side of the chart on next page shows the difference between the indoor intake air wet-bulb temperature and the indoor outlet air wet-bulb temperature for your reference at service.

How to measure the indoor air wet-bulb temperature difference

1. Attach at least 2 sets of wet-and dry-bulb thermometers to the indoor air intake as shown in the figure, and at least 2 sets of wet-and dry-bulb thermometers to the indoor air outlet. The thermometers must be attached to the position where air speed is high.
2. Attach at least 2 sets of dry-bulb thermometers to the outdoor air inlet. Cover the thermometers to prevent direct rays of the sun.
3. Check that the air filter is cleaned.
4. Open windows and doors of room.
5. Press the EMERGENCY OPERATION switch to start the EMERGENCY operation.
6. When system stabilizes after more than 15 minutes, measure temperature and take an average temperature.
7. 10 minutes later, measure temperature again and check that the temperature does not change.





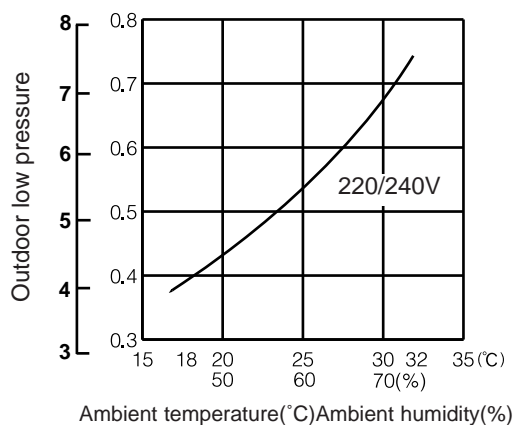
OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT COOL operation

① Both indoor and outdoor unit are under the same temperature/humidity condition.

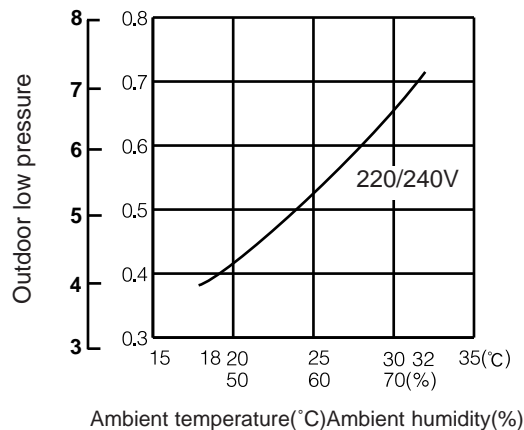
Dry-bulb temperature	Relative humidity(%)
20	50
25	60
30	70

② Air flow should be set at MAX.

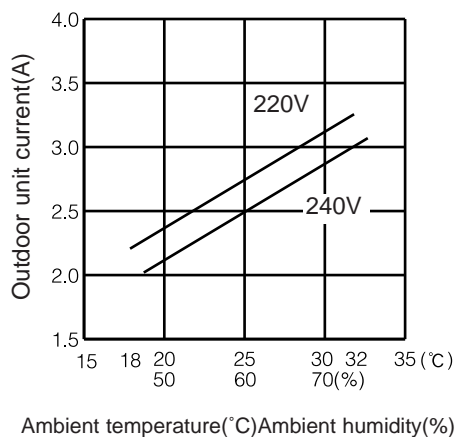
(kgf/cm²•G)(MPa•G) **MU-07NV** - [E1] [E2]



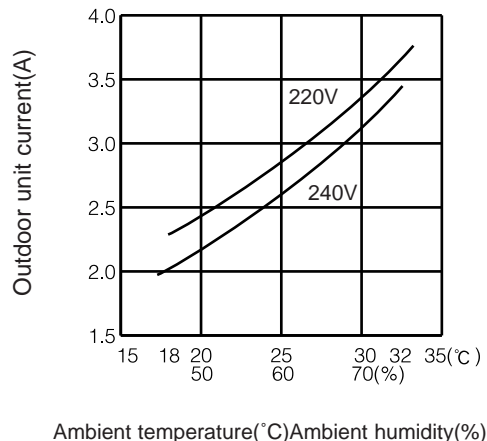
(kgf/cm²•G)(MPa•G) **MU-09NV** - [E1] [E2]



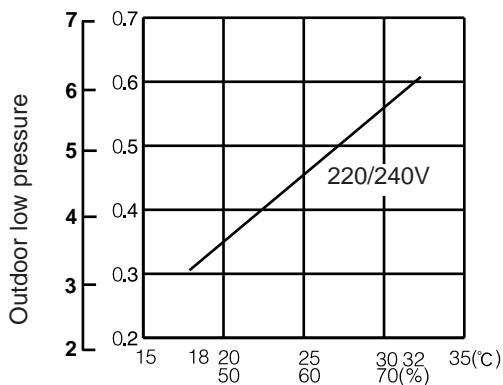
MU-07NV - [E1] [E2]



MU-09NV - [E1] [E2]

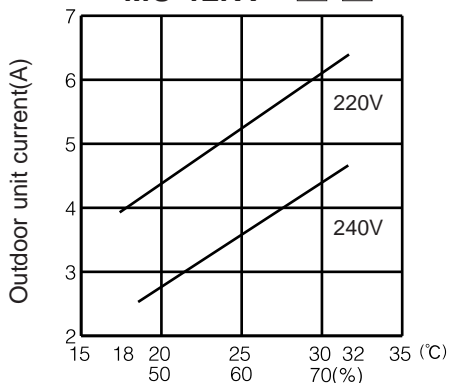


(kgf/cm²•G)(MPa•G) **MU-12NV** -[E1] [E2]



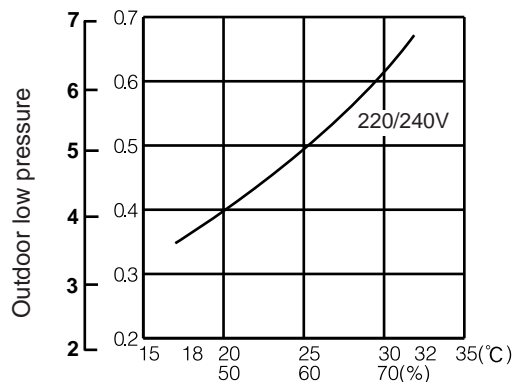
Ambient temperature(°C)Ambient humidity(%)

MU-12NV -[E1] [E2]



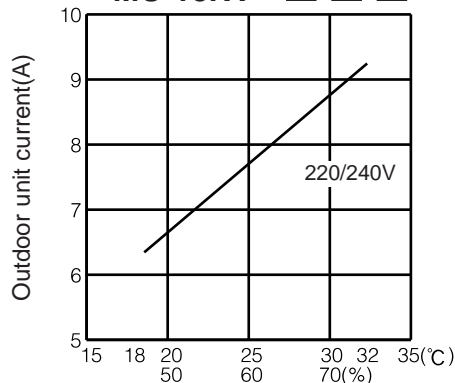
Ambient temperature(°C)Ambient humidity(%)

(kgf/cm²•G)(MPa•G) **MU-18NV** -[E1] [E2] [E3]



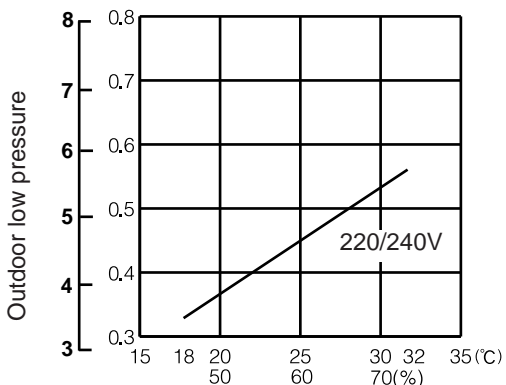
Ambient temperature(°C)Ambient humidity(%)

MU-18NV -[E1] [E2] [E3]



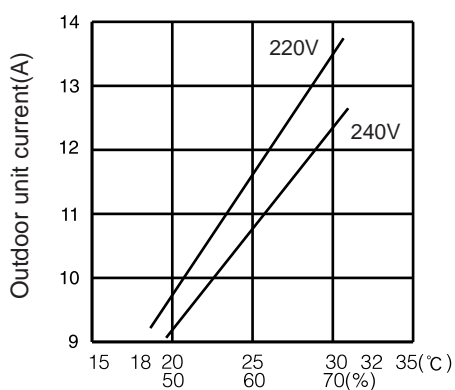
Ambient temperature(°C)Ambient humidity(%)

(kgf/cm²•G)(MPa•G) **MU-24NV** -[E1] [E2]



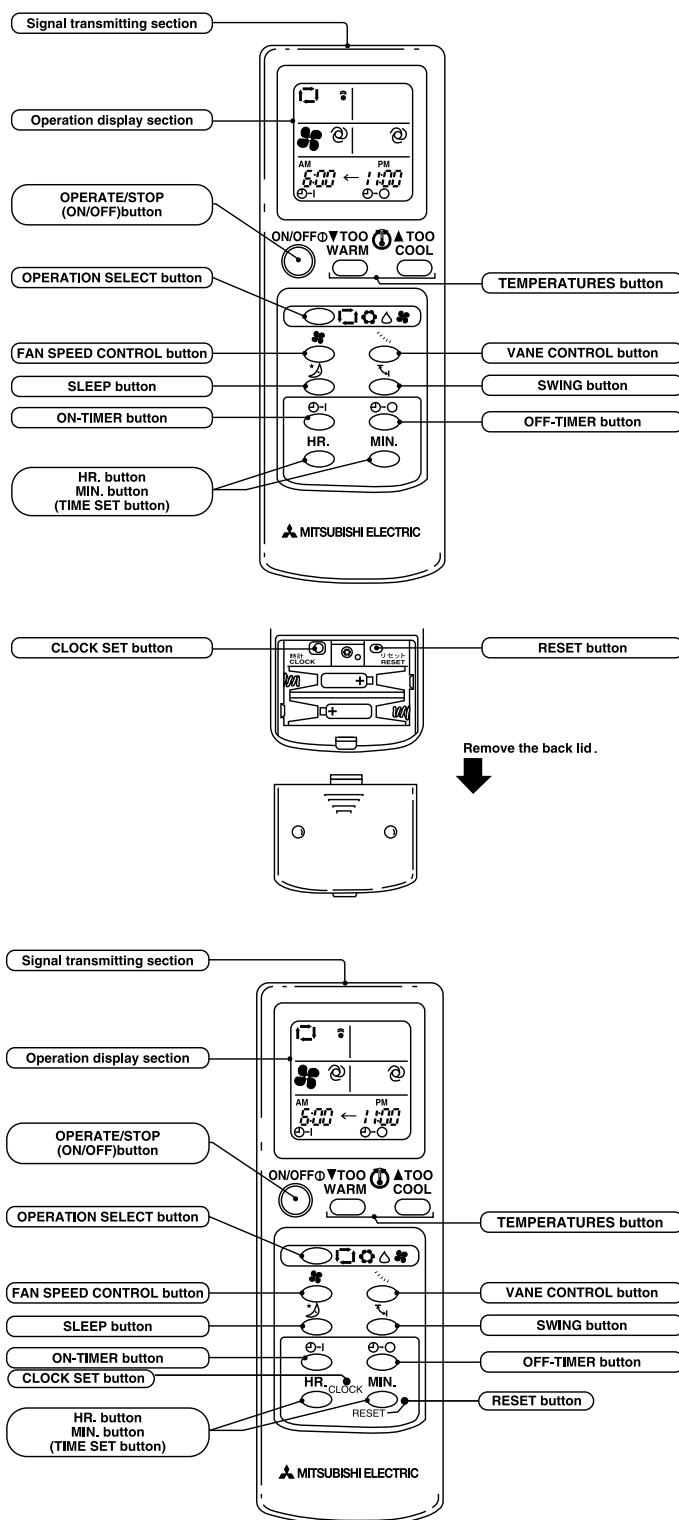
Ambient temperature(°C)Ambient humidity(%)

MU-24NV -[E1] [E2]



Ambient temperature(°C)Ambient humidity(%)

Wireless remote controller



INDOOR UNIT DISPLAY SECTION



MS-07NV -E1 MS-09NV -E1 MS-12NV -E1
 MS-18NV -E1 MS-24NV -E1 MS-07NV -E2
 MS-09NV -E2 MS-12NV -E2 MS-18NV -E2
 MS-24NV -E2 MS-18NV -E3

Once the controls are set, the same operation mode can be repeated by simply turning the OPERATE/STOP button ON. Indoor unit receives the signal with a beep tone. When the system turns off, 3-minute time delay will operate to protect system from overload and compressor will not restart for 3 minutes.

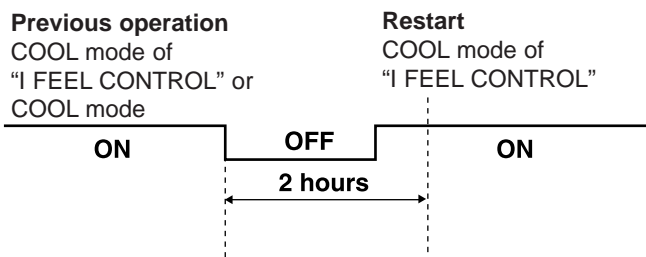
1. "I FEEL CONTROL" (□) OPERATION

- (1) Press OPERATE/STOP button on the remote controller. OPERATION INDICATOR LAMP of the indoor unit will turn on with a beep tone.
- (2) Press OPERATION SELECT button to set "I FEEL CONTROL" (□). Then a beep tone is heard.
- (3) The operation mode is determined by the initial room temperature at start-up of the operation.

Initial room temperature	mode
more than 25°C	COOL mode of "I FEEL CONTROL"
13°C to 25°C	DRY mode of "I FEEL CONTROL"

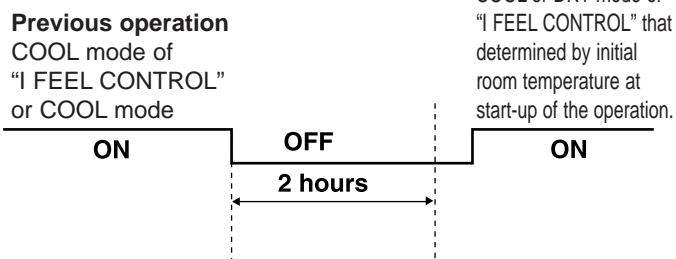
- Once the mode is fixed, the mode will not change by room temperature afterwards.
- Under the ON-TIMER (⌚) operation, the mode is determined according to the room temperature as the operation starts.
- When the system is stopped with the OPERATE/STOP button on the remote controller, and restarted within 2 hours in "I FEEL CONTROL" (□) mode, the system operates in previous mode automatically regardless of the room temperature.

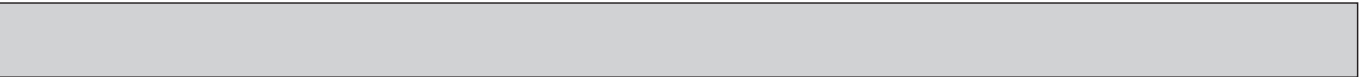
Example



- When the system is restarted after 2 hours, the operation mode is determined by the initial room temperature at start-up of the operation.

Example






(4) The initial set temperature is decided by the initial room temperature.

Model	Initial room temperature	Initial set temperature	
COOL mode of "I FEEL CONTROL "	26℃ or more	24℃	※1
	26℃ or less	Initial room temperature minus 2℃	
DRY mode of "I FEEL CONTROL "	13℃ or 25℃	Initial room temperature minus 2℃	

※1 After the system restarts by the remote controller, the system operates with the previous set temperature regardless of the initial set temperature.
The set temperature is calculated by the previous set temperature.

(5) TEMPERATURES buttons

In "I FEEL CONTROL" () mode, set temperature is decided by the microprocessor based on the room temperature. In addition, set temperature is controlled by TOO WARM or TOO COOL buttons when you feel too cool or too warm. Each time the TOO WARM or TOO COOL button is pressed, the indoor unit receives the signal and emits a beep tone.

● Fuzzy control

When the TOO COOL or TOO WARM button is pressed, the microprocessor changes the set temperature, considering the room temperature, the frequency of pressing TOO COOL or TOO WARM button and the user's preference to heat or cool. So this is called "Fuzzy control", and works only in "I FEEL CONTROL" mode.

In DRY mode of "I FEEL CONTROL", the set temperature doesn't change.

▲ TOO

COOL ... To raise the set temperature 1~2 degrees(°C)

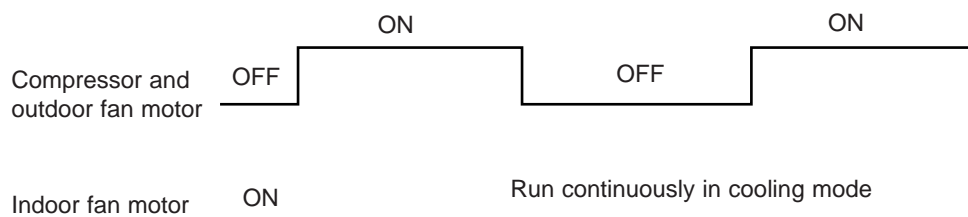


▼ TOO

WARM ... To lower the set temperature 1~2 degrees(°C)



— COOL mode of “I FEEL CONTROL” —



NOTE : Coil frost prevention during COOL mode of “I FEEL CONTROL”

There are two types of controls in coil frost prevention.

① Temperature control

<MS-0709/12> When the indoor coil thermistor RT12 reads 4°C or below for 5 minutes, the coil frost prevention mode starts.

<MS-18/24> When the indoor coil thermistor RT12 reads -1°C or below, the coil frost prevention mode starts immediately.

However, the coil frost prevention only works after 5 minutes from the compressor starts.

The compressor stops and the indoor fan operates at the set speed for 5 minutes.

After that, if RT12 still reads below 4°C (MS-07/09/12) or below -1°C (MS-18/24) this mode prolonged until the RT12 reads over 4°C (MS-07/09/12) or -1°C (MS-18/24).

② Time control

When the three conditions below have been satisfied for 1 hour and 45 minutes, compressor stops for 3 minutes.

a. Compressor has been continuously operating.

b. Indoor fan speed is Lo or Me.

c. Room temperature is below 26°C.

When compressor stops, the accumulated time is cancelled and when compressor restarts, time counting starts from the beginning.

Time counting also stops temporarily when the indoor fan speed becomes Hi or the room temperature exceeds 26°C. However, when two of the above conditions (b. and c.) are satisfied again, time accumulation is resumed.

● Indoor fan operates at the set speed by FAN SPEED CONTROL button.

Followings are the fan speed in AUTO.

Initial temperature difference	Fan speed
Room temperature minus set temperature : 2 degrees or more.....	Hi
Room temperature minus set temperature : 1 degree or more and less than 2 degrees.....	Me
Room temperature minus set temperature : less than 1 degree.....	Lo
	1 deg. 1.66 deg. 2 deg. 4 deg.

— DRY mode of “I FEEL CONTROL” —

The system for dry operation uses the same refrigerant circuit as the cooling circuit.

The compressor and the indoor fan are controlled by the temperature and the microprocessor.

By such controls, indoor flow amounts will be reduced in order to lower humidity without much room temperature decrease.

The operation of the compressor and indoor fan is as follows.

1. When the room temperature is 23°C or over:

Compressor operates by temperature control and time control.

① Set temperature is controlled to fall 2°C as initial set temperature.

② When the thermostat is ON, the compressor repeats 8 minutes ON and 3 minutes OFF.

When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.

Indoor fan and outdoor fan operate in the same cycle as the compressor.

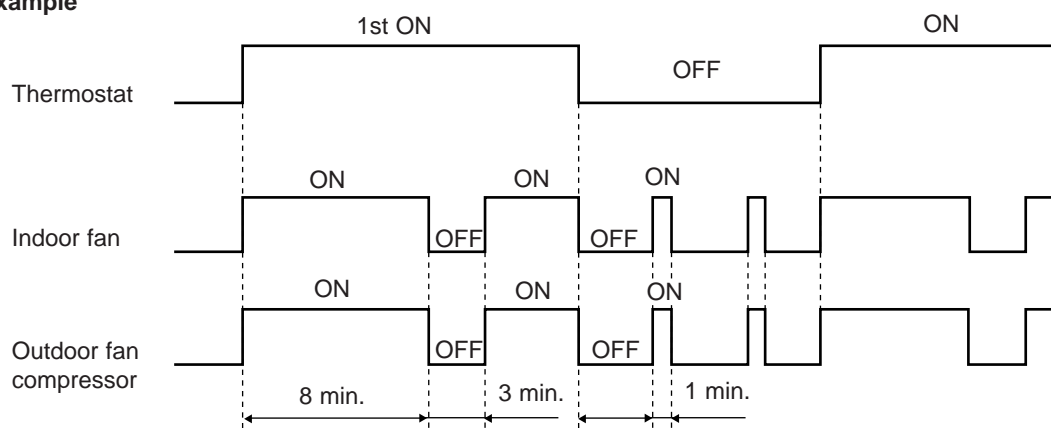
2. When the room temperature is under 23°C.

When the thermostat is ON, the compressor repeats 2 minutes ON and 3 minutes OFF.

When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.

Operation time chart

Example



NOTE ● Coil frost prevention during DRY mode of "I FEEL CONTROL"

The operation is same as coil frost prevention during COOL mode of "I FEEL CONTROL" excepting the indoor fan is OFF.

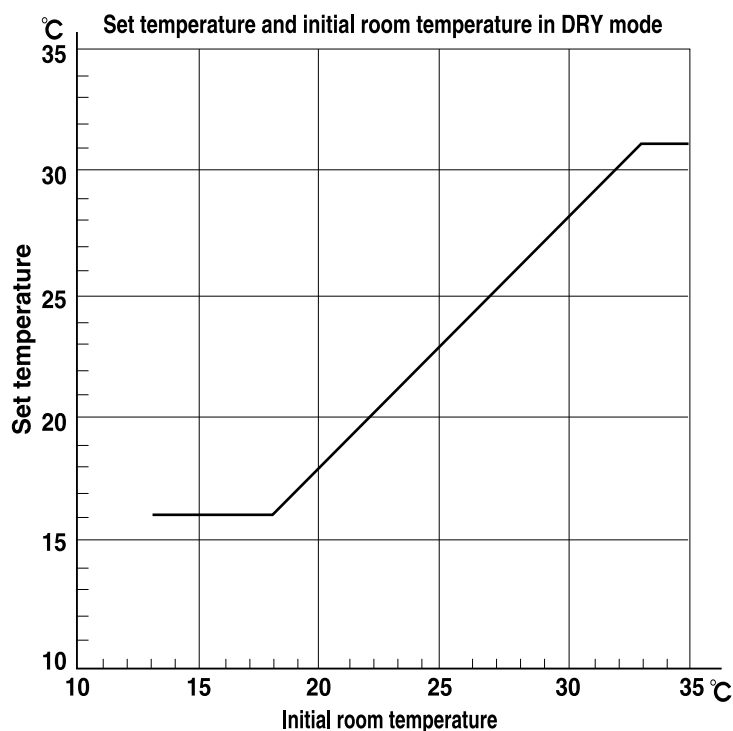
- During coil frost prevention the outdoor fan speed becomes Lo and the indoor fan is OFF.
(Because the coil frost prevention is priority.)

2. COOL (❄) OPERATION

- (1) Press OPERATE/STOP button.
OPERATION INDICATOR of the indoor unit turns on with a beep tone.
- (2) Select COOL mode.
- (3) Set the TEMPERATURES button.
(TOO WARM or TOO COOL button)
The setting range is 16 ~ 31°C
* Indoor fan continues to operate regardless of thermostat's OFF-ON
* Coil frost prevention is as same as COOL mode of "I FEEL CONTROL"

3. DRY (△) OPERATION

- (1) Press OPERATE/STOP button.
OPERATION INDICATOR of the indoor unit turns on with a beep tone.
- (2) Select DRY mode.
- (3) The microprocessor reads the room temperature and determines the set temperature.
Set temperature is as shown on the right chart.
Thermostat (SET TEMP.) does not work.
The other operations are same as DRY mode of "I FEEL CONTROL".
- (4) DRY operation will not function when the room temperature is 13°C or below.
- (5) When DRY operation functions, the fan speed is lower than cool operation.



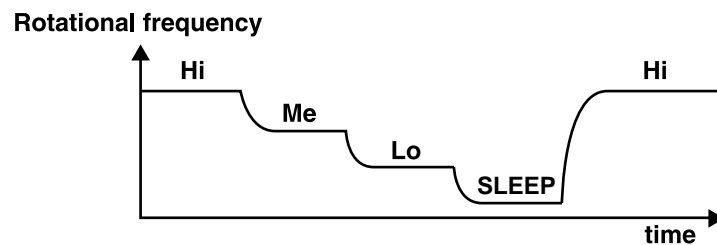
4. FAN () OPERATION

- (1) Press POWER ON/OFF button.
- (2) Select FAN mode with the OPERATION SELECT button.
- (3) Select the desired fan speed. When AUTO, it becomes Lo.
Only indoor fan operates. Outdoor unit does not operate.

5. FAN MOTOR CONTROL

- (1) Rotational frequency feedback control

The indoor fan motor is equipped with a rotational frequency sensor, and outputs signal to the microprocessor to feedback the rotational frequency. Comparing the current rotational frequency with the target rotational frequency (Hi, Me, Lo, SLEEP), the microprocessor controls SR11 (MS-07/09/12), IC141 (MS-18/24) and adjusts fan motor electric current to make the current rotational frequency close to the target rotational frequency. With this control, when the fan speed is switched, the rotational frequency changes smoothly.



- (2) Fan motor lock-up protection

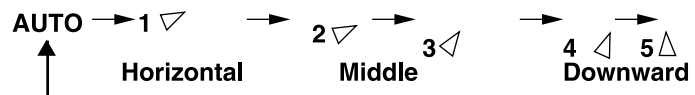
When the rotational frequency feedback signal has not output for 12 seconds, (or when the microprocessor cannot detect the signal for 12 seconds) the fan motor is regarded locked-up. Then the electric current to the fan motor is shut off. 3 minutes later, the electric current is applied to the fan motor again. During the fan motor lock-up, the OPERATION INDICATOR lamp flashes on and off to show the fan motor abnormality. (See page 38.)

6. AUTO VANE OPERATION

- (1) Vane motor drive

MS(D)-N series is equipped with a stepping motor for the vane. The rotating direction, speed, and angle of the motor are controlled by pulse signals (approx. 12V) transmitted from indoor microprocessor.

- (2) The auto vane angle changes as follows by pressing the VANE CONTROL () button.



(3) Positioning

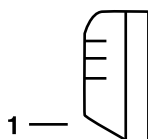
The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle. The positioning is decided as follows.

- (a) When the OPERATE/STOP button is pressed. (POWER ON/OFF)
- (b) When the vane control is changed from AUTO to MANUAL.
- (c) When the SWING is finished.
- (d) When the test run starts.
- (e) When the power supply turns ON.

(4) VANE AUTO (@) mode

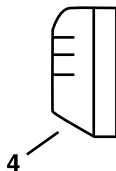
In VANE AUTO mode, the microprocessor automatically determines the vane angle and operation to make the optimum room-temperature distribution.

① In COOL and DRY operation



Vane angle is fixed to Angle 1.

② In FAN operation



Vane angle is fixed to Angle 4.

(5) Dew prevention

During COOL or DRY operation at Vane Angle 4 or 5 when the compressor cumulative operation time exceeds 1 hour, the vane angle automatically changes to Angle 1 for dew prevention.

(6) SWING MODE (ㄣ)

By pressing the SWING button (ㄣ) vane swings vertically. The remote controller displays “ ㄣ ”. SWING mode is cancelled when the SWING button or VANE CONTROL button (ㄣ) is pressed or the operation stops or changes to other mode.

7. SLEEP MODE (ㄣ)

- When the SLEEP button (ㄣ) is pressed, the indoor fan speed drops and the air flow sound from the indoor unit is decreased.
- The indications of the remote controller are “ ㄣ ” and “ ㄣ ”.
- When the FAN SPEED CONTROL button (ㄣ) is pressed during the SLEEP mode, the SLEEP mode is released.

8. TIMER OPERATION

1. How to set the timer

(1) Press OPERATE/STOP button to start the air conditioner.

(2) Check that the current time is set correctly.

NOTE : Timer operation will not work without setting the current time. Initially "AM0:00" blinks at the current time display of TIMER MONITOR so set the current time, correctly with CLOCK SET button.

(3) Press TIMER CONTROL button to select the operation.

"⌚→|" button... AUTO START operation (ON timer)

"⌚→○" button... AUTO STOP operation (OFF timer)

(4) Press HR. and MIN. button to set the timer. Time setting is 10-minute units.

HR. and MIN. button will work when "⌚→|" or "⌚→○" mark is flashing.

These marks disappear in 1 minute.

When setting the ON timer, check that OPERATION INDICATOR of the indoor unit lights.

NOTE1 : Be sure to place the remote controller at the position where its signal can reach the air conditioner even during TIMER operation, or the set time may deviate within the range of about 10 minutes.

NOTE2 : Reset the timer in the following cases, or the set time may deviate and other malfunctions may occur.

- A power failure occurs.
- The circuit breaker functions.

2. CANCEL

Timer setting can be cancelled with the TIMER CONTROL buttons. ("⌚→|" or "⌚→○")

To cancel the ON timer, press the "⌚→|" button.

To cancel the OFF timer, press the "⌚→○" button.

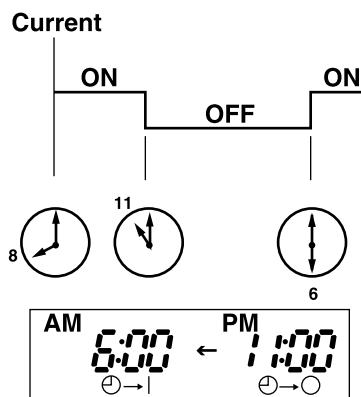
Timer is cancelled and the display of set time disappears.

PROGRAM TIMER

- The OFF timer and ON timer can be used in combination.
- "→" and "←" display shows the order of the OFF timer and ON timer operation.

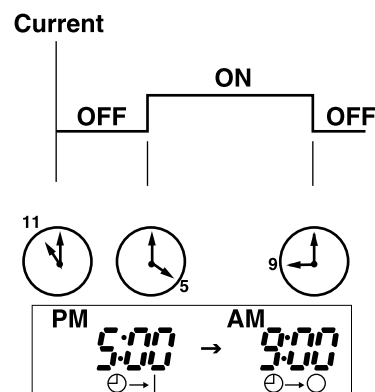
(Example 1) The current time is 8:00 PM.

The unit turns off at 11:00 PM, and on at 6:00 AM.



(Example 2) The current time is 11:00 AM.

The unit turns on at 5:00 PM, and off at 9:00 PM.



NOTE : TIMER setting will be cancelled by power failure or breaker functioning.

9. EMERGENCY-TEST OPERATION

When the remote controller is missing, or has failed, or when the batteries run down, press the EMERGENCY OPERATION switch on the front of the indoor unit. The unit will start and the OPERATION INDICATOR lamp will light.

The first 30 minutes of operation will be the test run operation. This operation is for servicing. The indoor fan runs at high speed and the system is in continuous operation. The thermostat is ON and the timer is reset to normal.

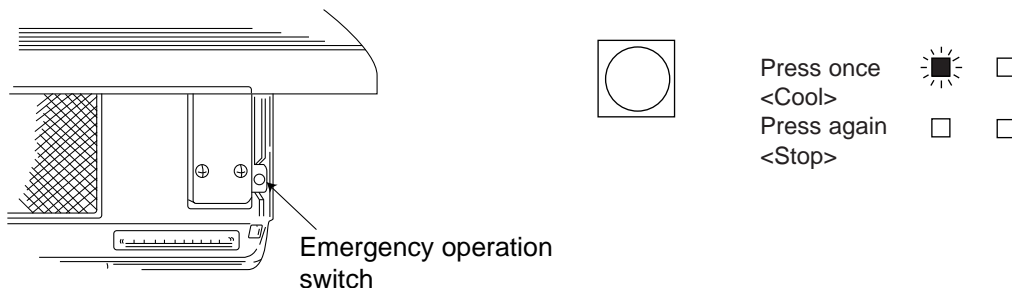
After 30 minutes of test run operation the system shifts to EMERGENCY COOL MODE with a set temperature of 24°C. The fan shifts to Me speed.

This operation continues until the EMERGENCY OPERATION switch is pressed again or any button on the remote controller is pressed, and after that normal operation will start.

The coil frost prevention circuit operates in this operation.

In the test run or Emergency operation, the horizontal vane operates in AUTO mode with a set temperature of 24°C.

NOTE : Do not press the EMERGENCY OPERATION switch during normal operation.



9

SERVICE FUNCTIONS

1. TIMER SHORT MODE

For service, set time can be shortened by short circuit of JPG and JPS on the electronics control P.C. board.

The time will be shortened as follows.

3-minute delay : 3-minute → 3-second.

AUTO START : 1 hour → 1-minutes

AUTO STOP : 1 hour → 1-minutes

Short the connector during the timer mode.

2. P.C. BOARD MODIFICATION FOR INDIVIDUAL OPERATION

A maximum of 4 indoor units with wireless remote controllers can be used in a room.

In this case, to operate each indoor unit individually by each remote controller, P.C. boards of remote controller must be modified according to the number of the indoor unit.

(1) <The reset button can be located on the rear side.>

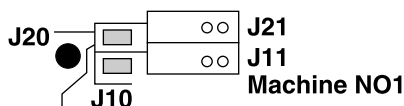
MS-07NV -[E1] MS-09NV -[E1] MS-12NV -[E1] MS-18NV -[E1]

MS-24NV -[E1] MS-18NV -[E2]

How to modify the remote controller P.C. board

Remove batteries before modification.

The board has a print as shown below :



Machine NO2

The P.C.board has the print "J10" and "J20".Jumper wires are mounted to each "J10" and "J20".Replace J20 and J10 with J21 and J11 according to the number of indoor unit as shown in Table 1.

After modification,push the reset button near the batteries.

NOTE : For remodeling, take out the batteries at first.

After finish remodeling, put back the batteries then push the RESET button.

Table.1

	1 unit operation	2 units operation	3 units operation	4 units operation
No. 1 unit	No modification	Same as at left	Same as at left	Same as at left
No. 2 unit	—	Replace J10 with J 11	Same as at left	Same as at left
No. 3 unit	—	—	Replace J20 with J 21	Same as at left
No. 4 unit	—	—	—	Replase J10 with J11 Replase J20 with J21

Note : When power supply failure or installation time, Indoor unit will delete memory about its remote controller so when power supply is restoration again, indoor unit recommend its remote controller by receive signal from remote controller at first.

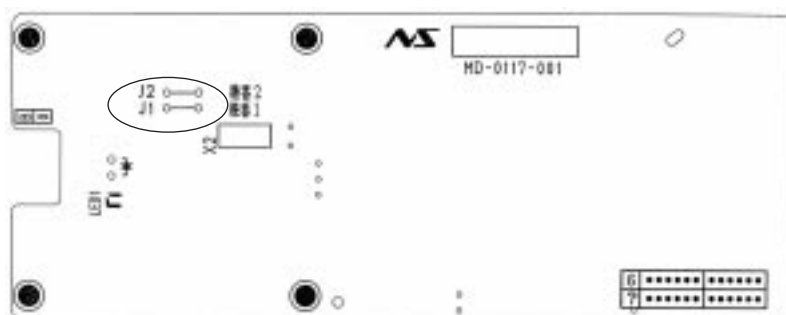
(2)<The reset button can be located on the front side.>

MS-07NV -[E1] (Product number 7000001T~)	MS-09NV -[E1] (Product number 7000001T~)
MS-12NV -[E1] (Product number 7000001T~)	MS-24NV -[E1] (Product number 7000001T~)
MS-07NV -[E2]	MS-09NV -[E2]
MS-12NV -[E2]	MS-18NV -[E2] (Product number 7000001T~)
MS-24NV -[E2]	MS-18NV -[E3]

How to modify the remote controller P.C. board

Remove batteries before modification.

The board has a print as shown below :



NOTE : For remodeling, take out the batteries at first.
After finish remodeling, put back the batteries then push the RESET button.

The P.C.board has the print “J1” and “J2”.Jumper wires are mounted to each “J1” and “J2”.Cut J1 and J2 according to the number of indoor unit as shown in Table 1.

After modification,push the reset button.

Table.1

	1 unit operation	2 units operation	3 units operation	4 units operation
No. 1 unit	No modification	Same as at left	Same as at left	Same as at left
No. 2 unit	—	Cut J1	Same as at left	Same as at left
No. 3 unit	—	—	Cut J2	Same as at left
No. 4 unit	—	—	—	Cut both J1 and J2

Note : At power supply failure or installation. indoor unit deletes the memory about remote controller. When the power supply is turned on and indoor unit receives the first signals from the remote controller, the remote controller number is designated as the indoor unit number. Therefore at and after the second time indoor unit accepts the remote controller of the initial setting number.

At setting-error, turn the power supply off to cancel the individual operation, and then turn the power supply on to restart the setting.

2. AUTO RESTART FUNCTION

MS-07NV -[E2]

MS-09NV -[E2]

MS-12NV -[E2]

MS-24NV -[E2]

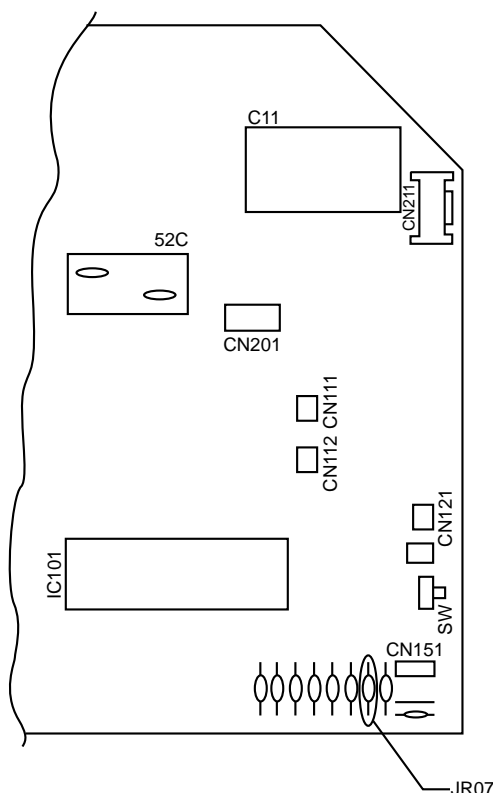
MS-18NV -[E3]

When the indoor unit is controlled with the remote controller, the operation mode, set temperature, and the fan speed are memorized by the indoor electronic control P.C.board. The "AUTO RESTART FUNCTION" sets to work the moment power has restored after power failure. Then, the unit will restart automatically. However if the unit is operated in "I FEEL CONTROL" mode before power failure, the operation is not memorized. In "I FEEL CONTROL" mode, the operation is decided by the initial room temperature.

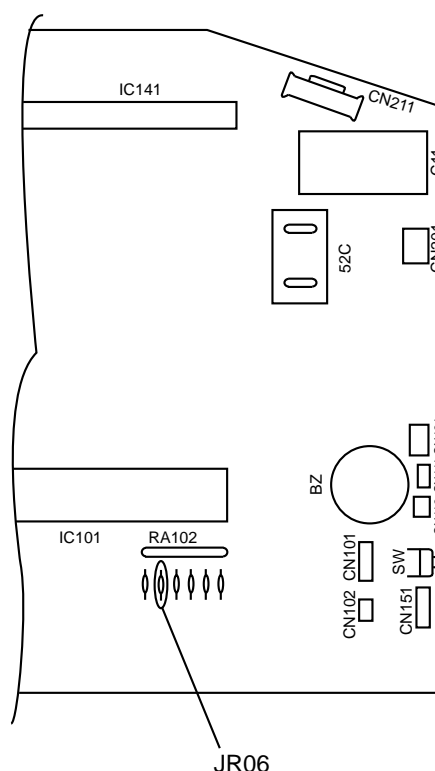
How to set "AUTO RESTART FUNCTION"

- ① Turn off the main power for the unit.
- ② Removed the electronic control P.C. board and the display P.C.board.(See page 45 and 47.)
- ③ Cut the RESISTOR JR07 (MS-07/09/12) or JR06(MS-18/24) on the indoor electronic control P.C.board.

MS-07/09/12



MS-18/24



Operation

- ① If the main power (220/240V AC) has been cut, the operation settings remain.
- ② After the power is restored, the unit restarts automatically according to the memory.(However, it takes at least 3 minutes for the compressor to start running.)

Note:

- The operation settings are memorized when 10 seconds have passed after the indoor unit was operated with the remote controller.
- If main power is turned off while AUTO START/STOP timer is active, the timer setting is cancelled when auto restart function works.
- If the unit has been off with the remote controller before power failure, the auto restart function does not work as the power button of the remote controller is off.
- To prevent breaker off due to the rush of starting current, systematize other home appliance not to turn on at the same time.
- When more than one air conditioners are connected under the same power system, compressor starting current as large as that for all the compressors used flows at a time as soon as the units restart automatically. Therefore, the specific counter-measures are required to prevent main voltage drop or the rush of starting current after power failure by providing the system to allow the units to start in regular succession.

MS-07NV -[E1]	MS-09NV -[E1]	MS-12NV -[E1]	MS-18NV -[E1]
MS-24NV -[E1]	MS-07NV -[E2]	MS-09NV -[E2]	MS-12NV -[E2]
MS-18NV -[E2]	MS-24NV -[E2]	MS-18NV -[E3]	

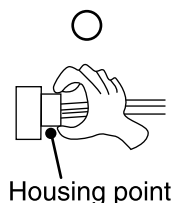
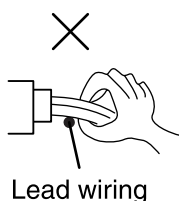
10-1 Cautions on troubleshooting

10-1-1 Before troubleshooting, check the followings:

- 1) Check the power supply voltage.
- 2) Check the indoor/outdoor connecting wire for mis-wiring.

10-1-2 Take care the followings during servicing.

- 1) Before servicing the air conditioner, be sure to first turn off the remote controller to stop the main unit, and then after confirming the horizontal vane is closed, turn off the breaker.
- 2) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.
- 3) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.



10-1-3 Troubleshooting procedure

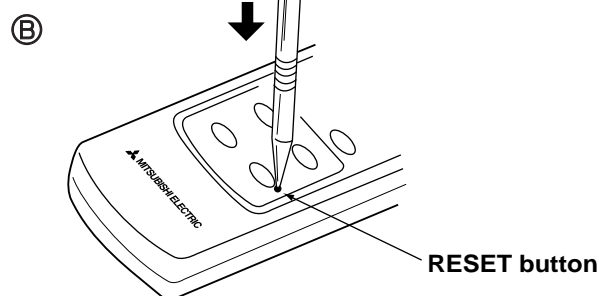
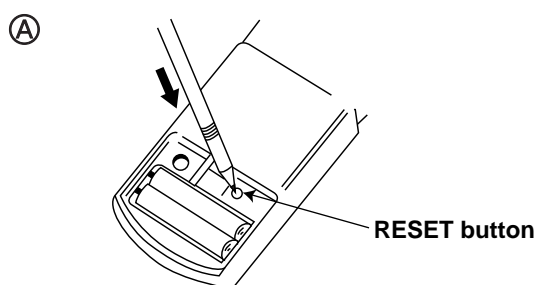
- 1) First, check if the OPERATION INDICATOR lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check the abnormality indication for 2 or 3 times before starting service work.
- 2) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.
- 3) When troubleshooting, refer to the flow chart and the check table on page 38.

10-1-4 How to replace batteries

Weak batteries may cause the remote controller malfunction.

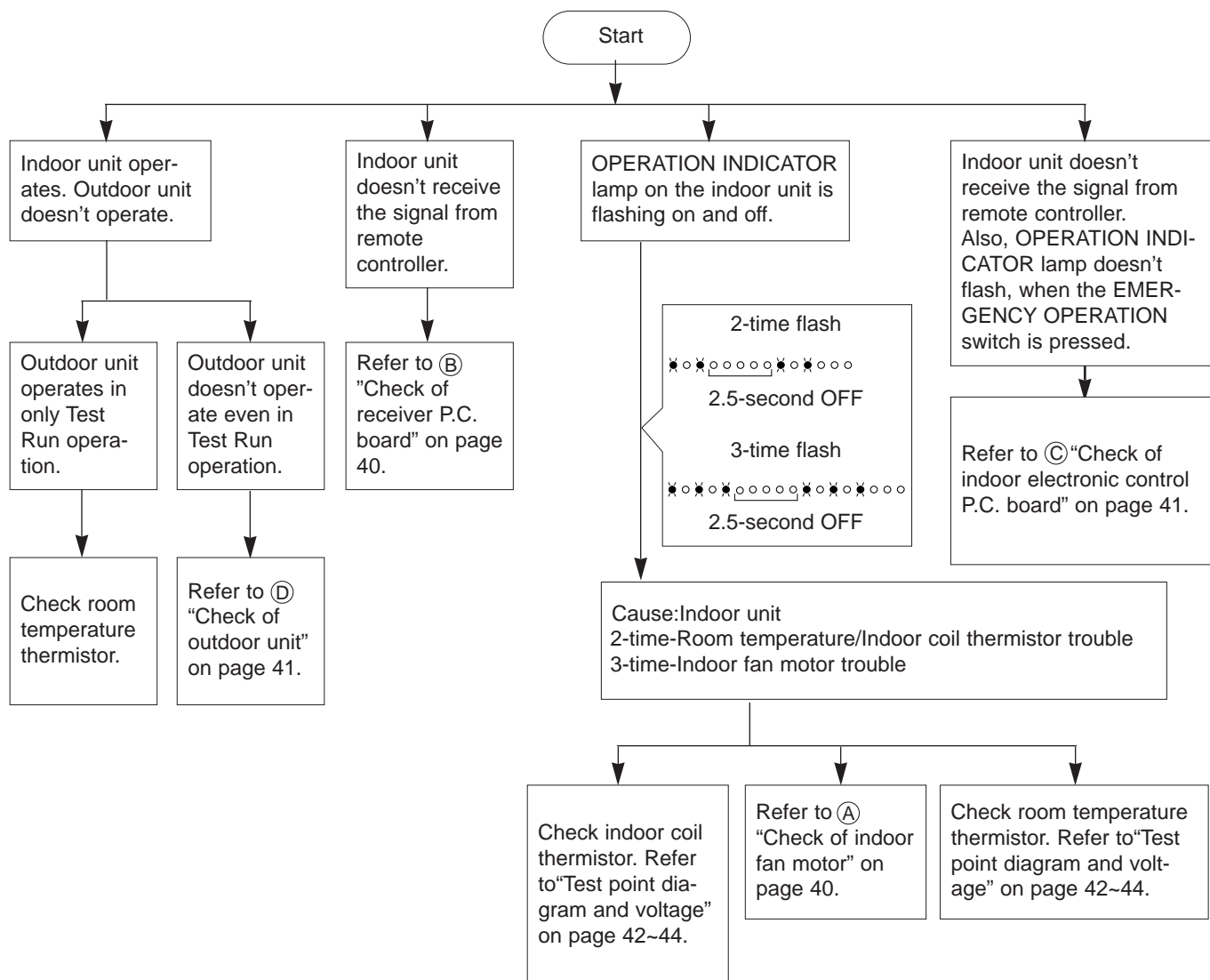
In this case, the remote controller can not be repaired only by the battery replacement. To operate the remote controller normally, discharge the remote controller in the following order.

This remote controller has the reset button. After refilling new batteries, press the reset button with tip end of ball point pen or the like, and then use the remote controller.

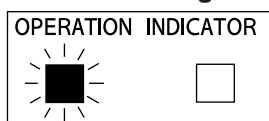


There are two kinds of remote controllers. ① type has the RESET button at the back, and ② type does it on the front.

10-2 Instruction of troubleshooting



10-2-1 troubleshooting check table



※ Before taking measures make sure that the symptom reappears, for accurate troubleshooting.

Self check table

NO.	Abnormal point	Indication	Symptom	Detect method	Check point
1	Indoor coil thermistor	2-time flash ●○○○○●○○○○ 2.5-second OFF	Outdoor unit does not run.	Detect Indoor coil/room temperature thermistor short or open circuit every 2 seconds during operation.	<ul style="list-style-type: none"> ● Check thermistor calibration. ● Reconnect connector. ● Check indoor electronic control P.C. board.
	Room temperature thermistor				
2	Indoor fan motor	3-time flash ●○○●○○○○●○○○○ 2.5-second OFF	Indoor fan repeats 12 seconds ON and 3 minutes OFF. When the indoor fan breaks, the fan keeps stopping.	When rotational frequency feedback signal is not emit during 12-second indoor fan operation	<ul style="list-style-type: none"> ● Disconnect connector CN211 and then check connector CN121 ② - ③ to make sure rotational frequency feedback signal of 1.5V or over exists. ● Check indoor electronic control P.C. board. ● Check indoor fan motor. ● Reconnect connector.



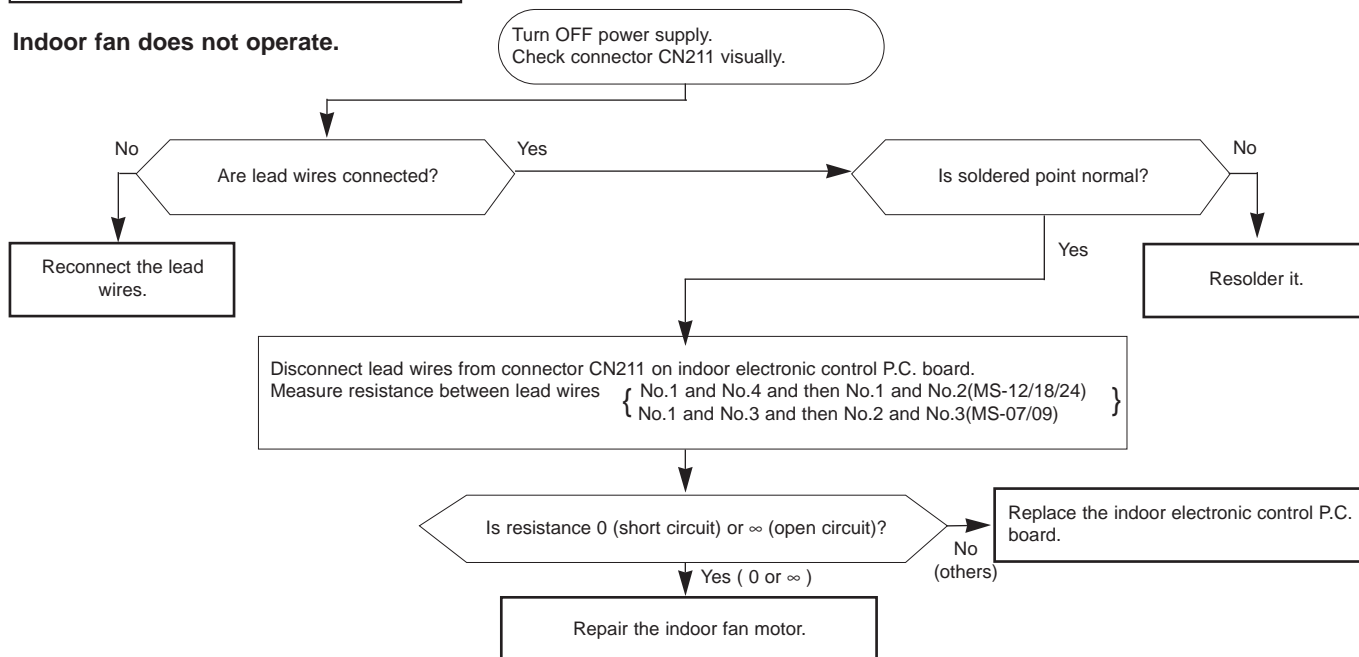
MS-07NV -[E1] MS-09NV -[E1] MS-12NV -[E1] MS-18NV -[E1]
 MS-24NV -[E1] MS-07NV -[E2] MS-09NV -[E2] MS-12NV -[E2]
 MS-18NV -[E2] MS-24NV -[E2] MS-18NV -[E3]

10-2-2 Trouble criterion of main parts

Part name	Check method and criterion					Figure
Room temperature thermistor	Measure the resistance with a tester. (Part temperature 10°C ~ 30°C)					
Indoor coil thermistor	Normal		Abnormal			
	8kΩ ~ 20kΩ		Opened or short-circuited			
Compressor	Measure the resistance between the terminals with a tester. (Coil wiring temperature -10°C ~ 40°C)					
		Normal				Abnormal
		07NV	09NV	12NV	18NV	24NV
C-R	3.67~4.50Ω	3.56~4.36Ω	1.86~2.28Ω	1.05~1.30Ω	0.84~1.04Ω	Opened or short-circuited
C-S	5.07~6.21Ω	5.25~6.44Ω	3.50~4.29Ω	2.38~2.92Ω	1.82~2.24Ω	
Indoor fan motor	Motor part	Measure the resistance between the terminals with a tester. (Coil wiring temperature 10°C ~ 30°C)				
		Normal		Abnormal		
		07/09/12NV		18/24NV		
WHT-BLK	280 ~ 303Ω		176 ~ 192Ω		Opened or short-circuited	
BLK-RED	313 ~ 336Ω		240 ~ 261Ω			
	Sensor part	Measure the voltage Power ON.				
		BRN-YLW	Normal		Abnormal	
		YLW-GRY	(When fan revolved one time) 0V→5V→0V (Approx.)		Remain 0V or 5V	
Outdoor fan motor	Measure the resistance between the terminals with a tester. (Coil wiring temperature -10°C ~ 40°C)					
		Normal				Abnormal
		07/09NV	12NV	18NV	24NV	Opened or short-circuited
WHT-BLK	236 ~ 290Ω	115 ~ 141Ω	102 ~ 126Ω	71.5 ~ 87.5Ω		
BLK-RED	344 ~ 422Ω	118 ~ 146Ω	97.9 ~ 120Ω	90.1 ~ 111Ω		
BLK-YLW	—	—	—	81.3 ~ 99.5Ω		
Vane motor	Measure the resistance between the terminals with a tester. (Part temperature 10°C ~ 30°C)					
	Normal		Abnormal			
07/09/12NV	282 ~ 305Ω	Opened or short-circuited				
18/24NV	358 ~ 388Ω					

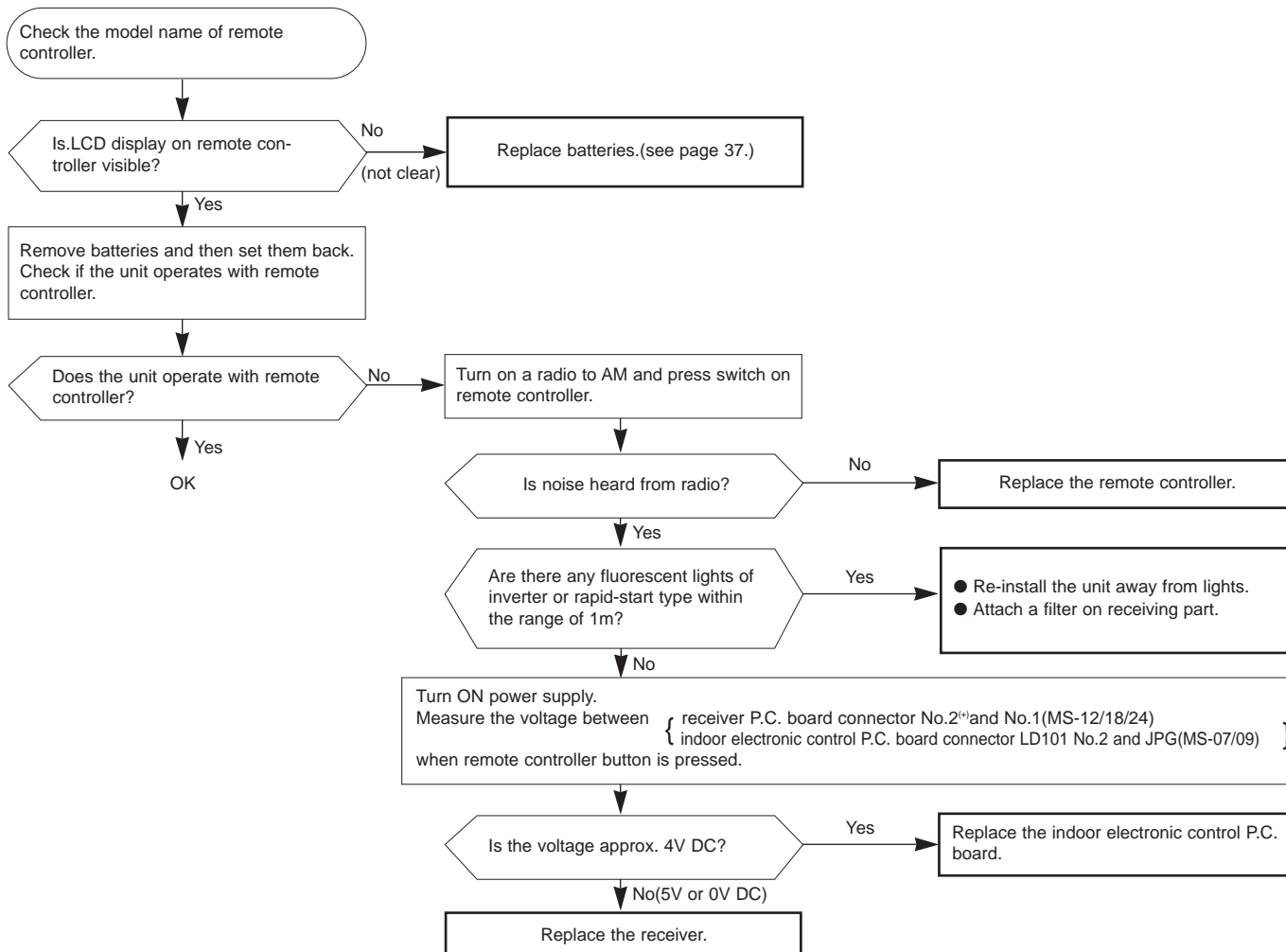
A Check of indoor fan motor

Indoor fan does not operate.



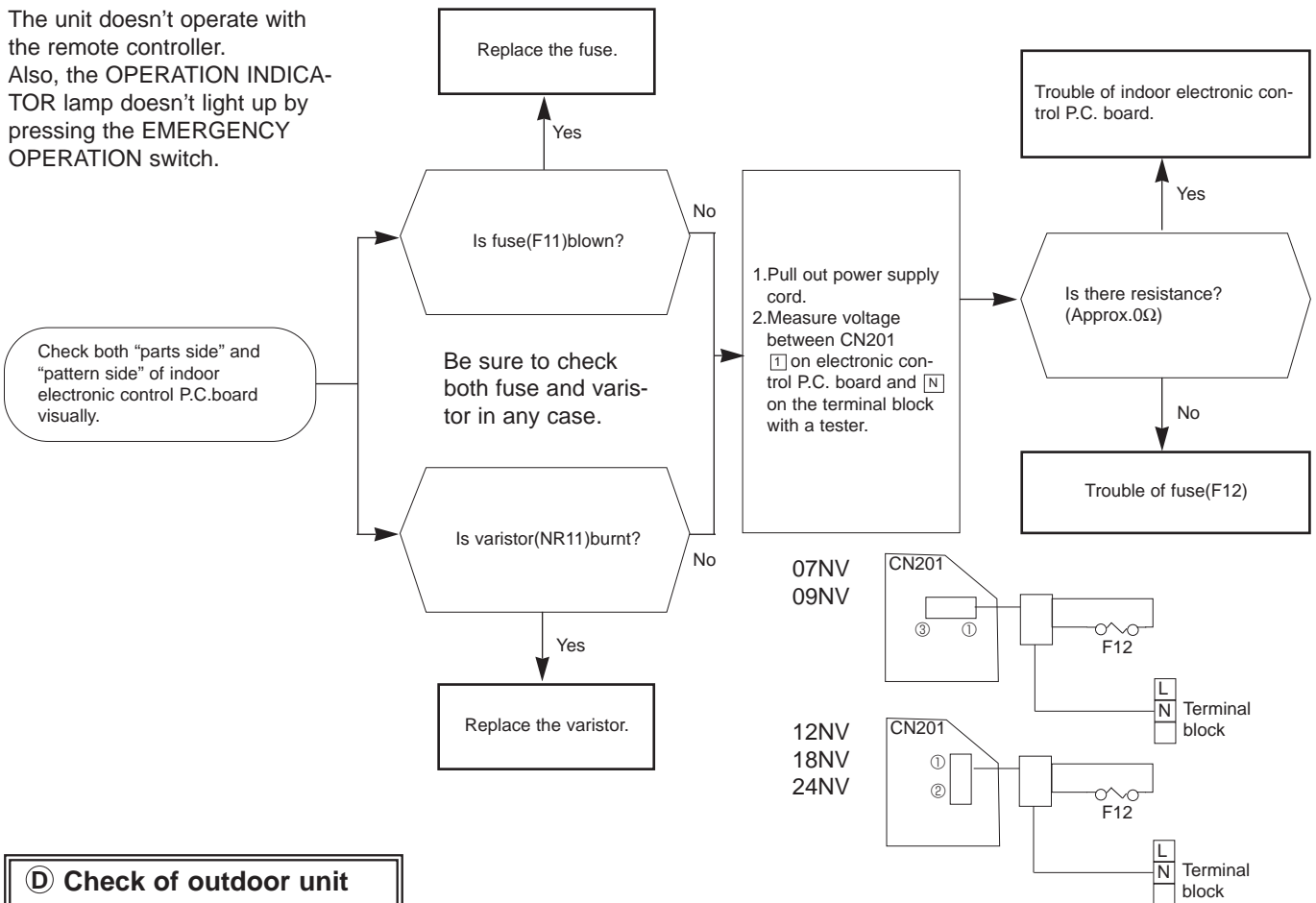
B Check of receiver P.C. board

Indoor unit operates by pressing the EMERGENCY OPERATION switch, but does not operate with the remote controller.



© Check of indoor electronic control P.C. board

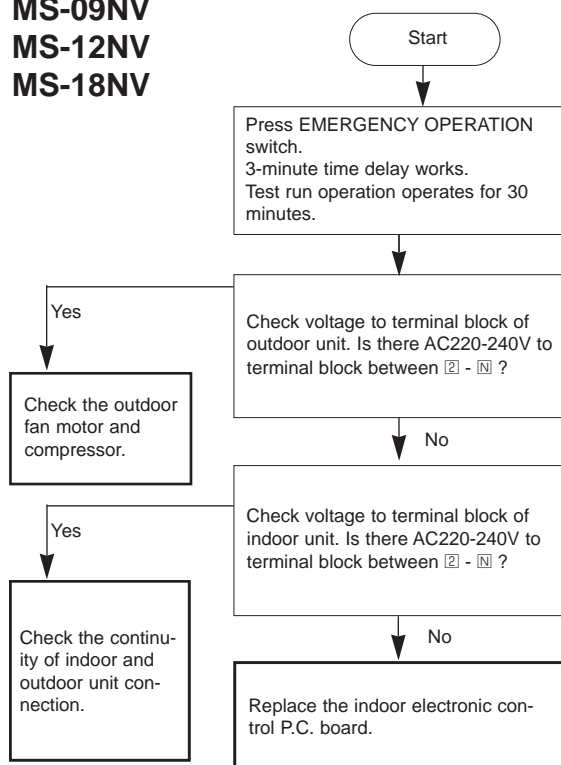
The unit doesn't operate with the remote controller.
Also, the OPERATION INDICATOR lamp doesn't light up by pressing the EMERGENCY OPERATION switch.



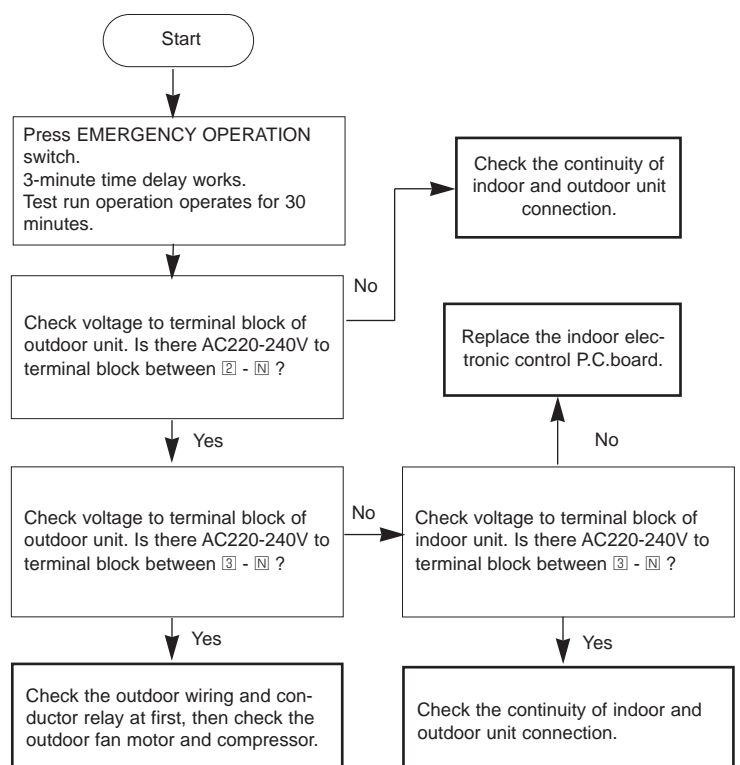
④ Check of outdoor unit

Compressor and outdoor fan do not operate.(Only indoor fan operates.)

MS-07NV
MS-09NV
MS-12NV
MS-18NV



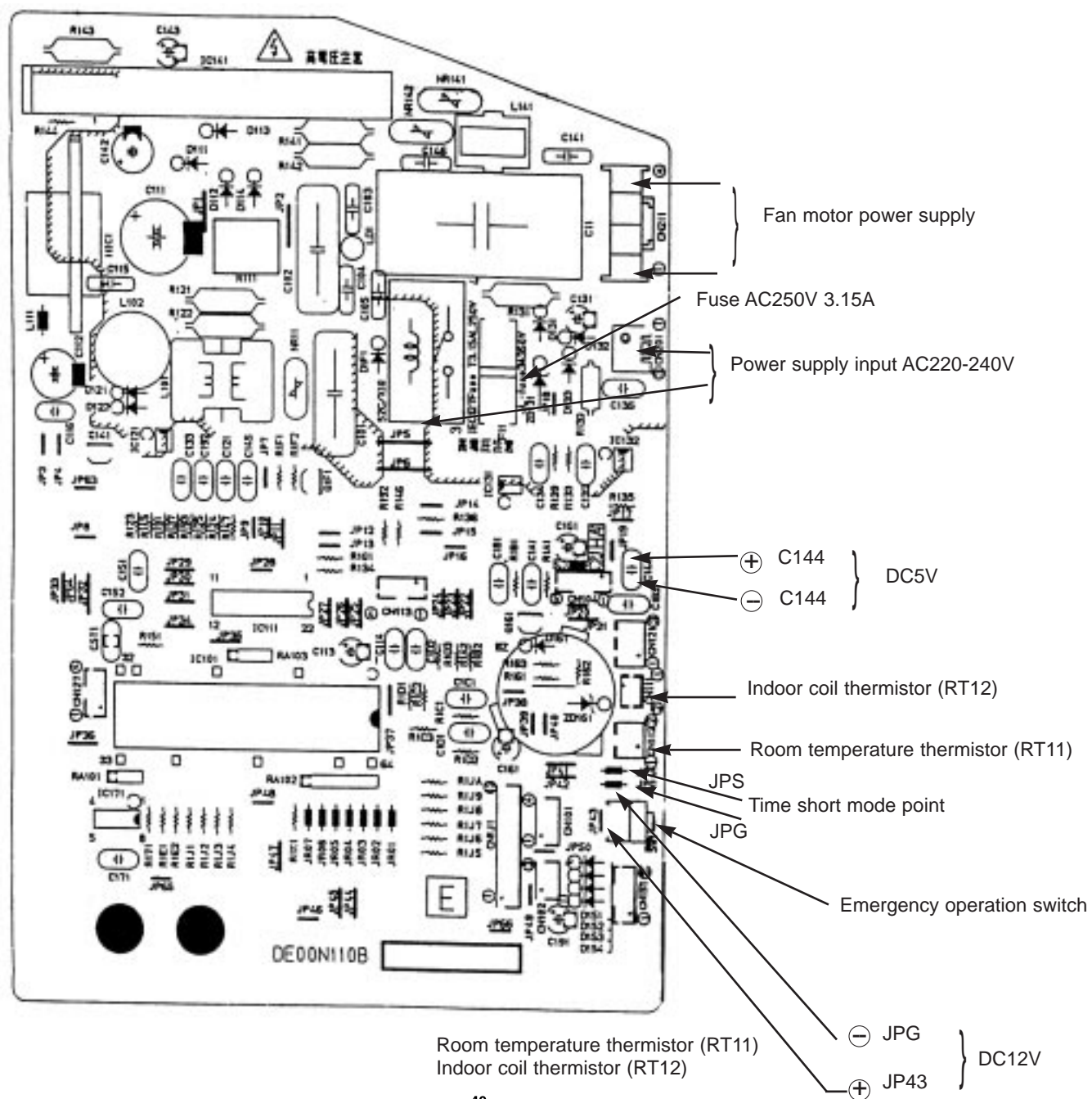
MS-24NV



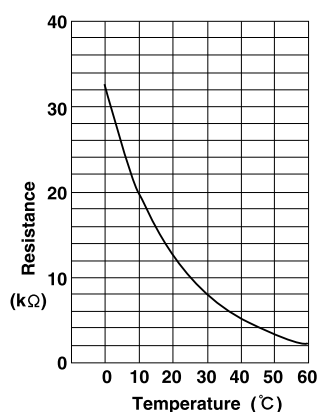
TEST POINT DIAGRAM AND VOLTAGE

MS-18NV -[E1]

Indoor electronic control P.C. board



Room temperature thermistor (RT11)
Indoor coil thermistor (RT12)

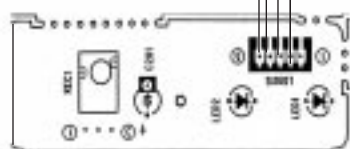
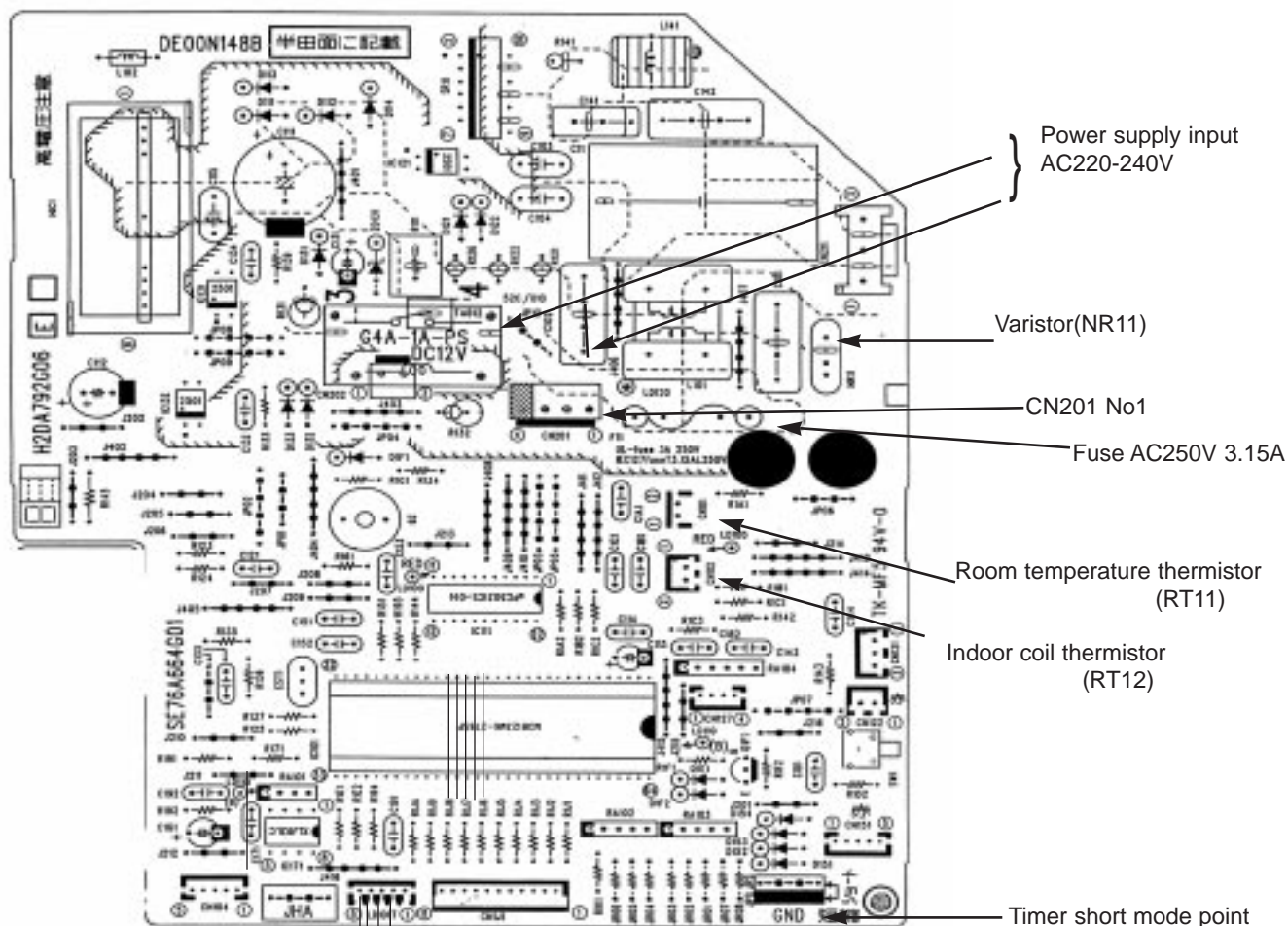


TEST POINT DIAGRAM AND VOLTAGE

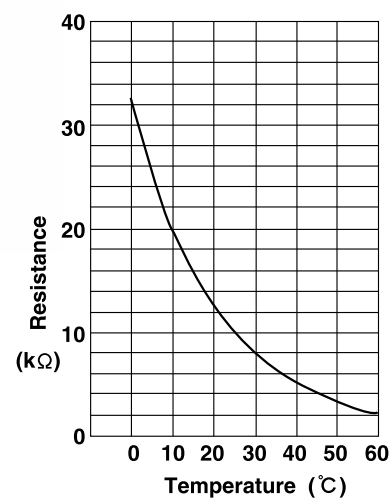
MS-07NV -[E1] MS-09NV -[E1] MS-12NV -[E1]

MS-07NV -[E2] MS-09NV -[E2] MS-12NV -[E2]

Indoor electronic control P.C. board



Room temperature thermistor (RT11)
Indoor coil thermistor (RT12)

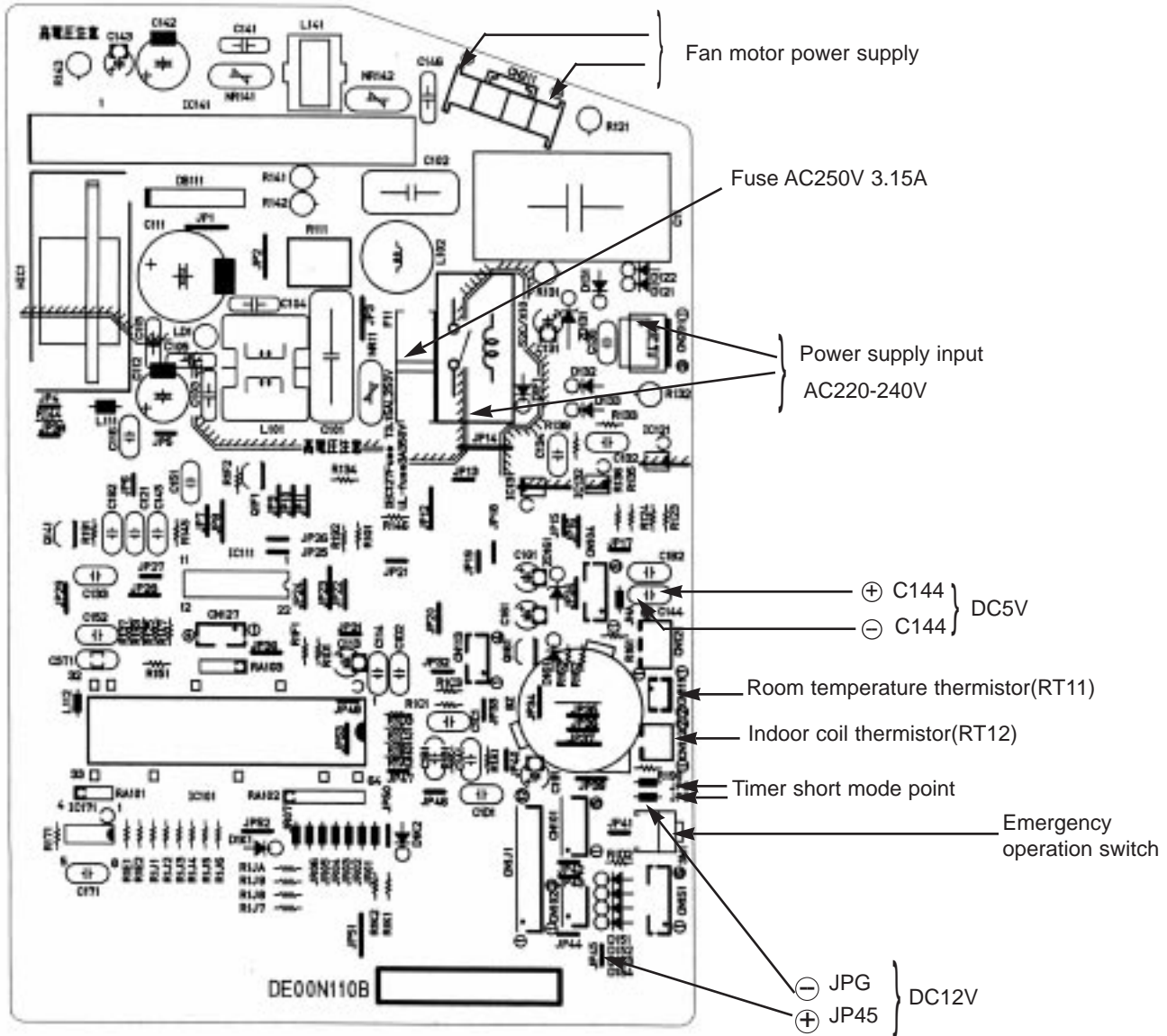


TEST POINT DIAGRAM AND VOLTAGE

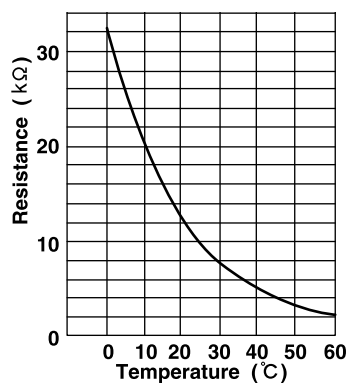
MS-24NV -[E1] MS-18NV -[E2]

MS-24NV -[E2] MS-18NV -[E3]

Indoor electronic control P.C. board

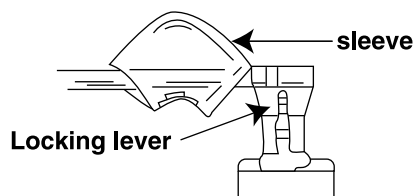


Room temperature thermistor (RT11)
Indoor coil thermistor (RT12)



NOTE:

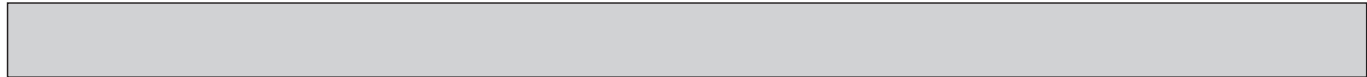
✳ on the wiring diagram shows the terminals with a lock mechanism, so it cannot be removed when you pull the lead wire. Be sure to pull the wire by pushing the locking lever (projected part) of the terminal with a finger.

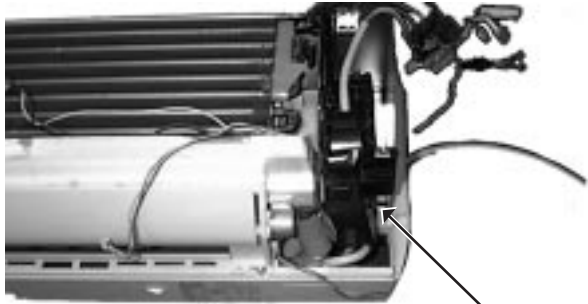
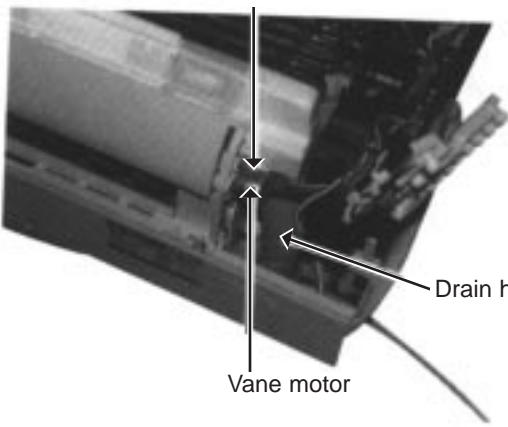
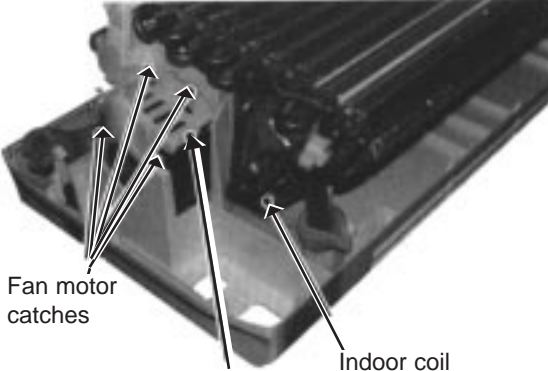


- ① Slide the sleeve.
- ② Pull the wire while pushing the locking lever.

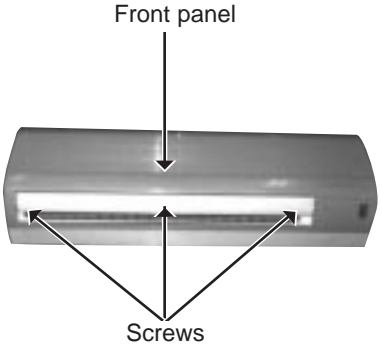
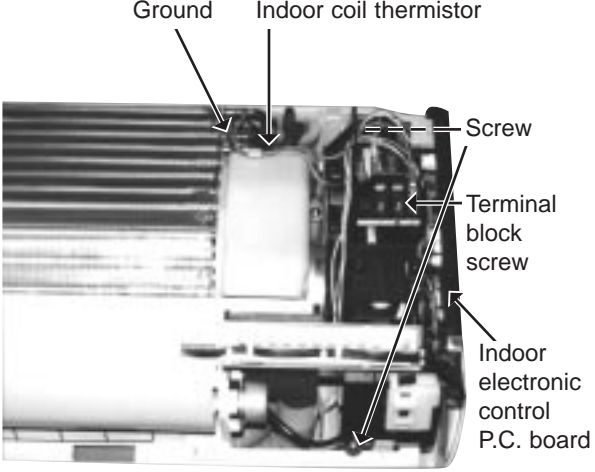
11-1 MS-07NV -[E1] MS-09NV -[E1] MS-12NV -[E1]
MS-07NV -[E2] MS-09NV -[E2] MS-12NV -[E2]
INDOOR UNIT

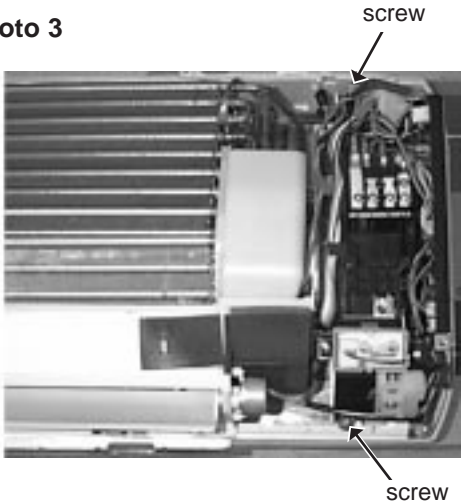
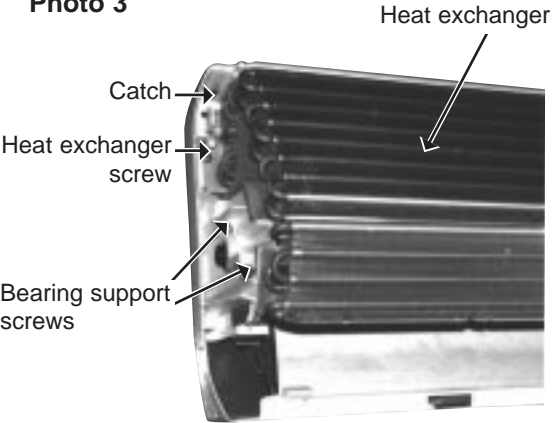
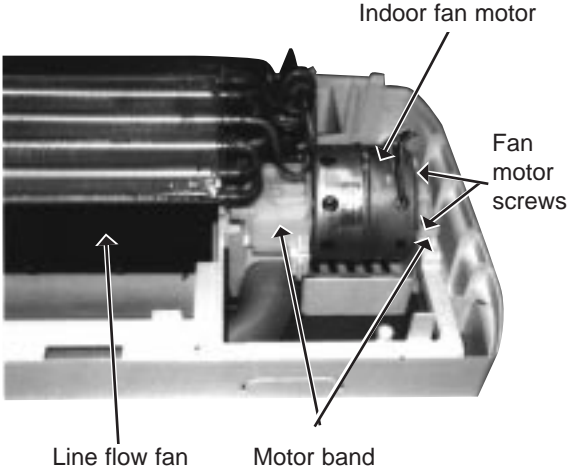
OPERATING PROCEDURE	PHOTOS
<p>1. Removing the front panel</p> <ol style="list-style-type: none"> (1) Remove the screws caps of the front panel. Remove the screws. (2) Pull the panel down to your side slightly and unhook the catches at the top. 	<p>Photo 1</p> <p>Front panel</p> <p>Screws</p>
<p>2. Removing the electronic control P.C. board and the display P.C. board.</p> <ol style="list-style-type: none"> (1) Remove the front panel. (Refer to 1) (2) Remove the screw of the electrical cover. Remove the electrical cover. (3) Disconnect the room temperature thermistor and the connector from the indoor coil thermistor. (4) Remove the terminal cover. Remove the screw of the terminal block. (5) Remove the cord clamp. (6) Disconnect all the connectors on the electronic control P.C. board. (7) Remove the screw of the ground wire. (8) Disconnect the white lead wire and the brown lead wire from 52C relay. (9) Remove the electronic control P.C. board and the display P.C. board. 	<p>Photo 2</p> <p>Room temperature thermistor connector</p> <p>Ground wire screw</p> <p>Cord clamp</p> <p>Terminal block cover</p> <p>Indoor electronic control P.C. board</p> <p>Terminal block cover screw</p>



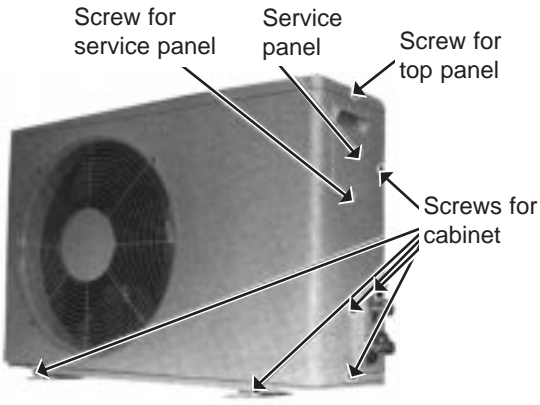
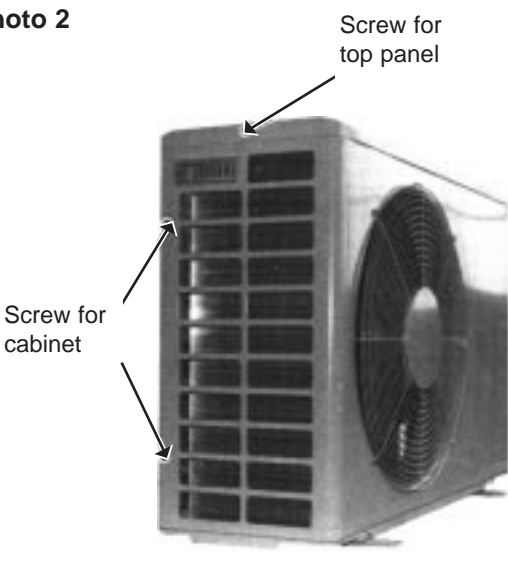
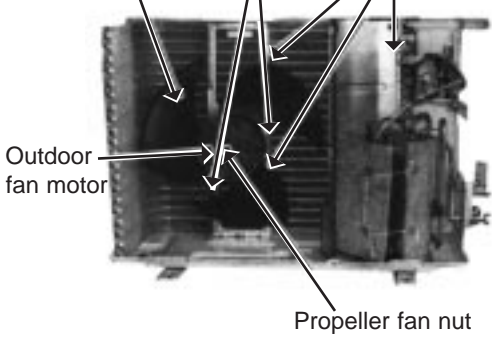
OPERATING PROCEDURE	PHOTOS
<p>3. Removing the electrical box</p> <ul style="list-style-type: none">(1) Remove the front panel. (Refer to 1)(2) Remove the electrical cover.(3) Disconnect the connector of the indoor coil thermistor.(4) Disconnect the motor connector (CN211 and CN121) and the vane motor connector (CN151) on the electronic control P.C. board.(5) Unhook the catches (both upper and lower), remove the electrical box.	 <p>Catch</p>
<p>4. Removing the vane motor</p> <ul style="list-style-type: none">(1) Remove the front panel.(2) Remove the screw of the vane motor, disconnect the connector.(3) Remove the vane motor.	<p>Photo 3</p>  <p>Vane motor screw</p> <p>Drain hose</p> <p>Vane motor</p>
<p>5. Removing the line flow fan and the indoor fan motor</p> <ul style="list-style-type: none">(1) Remove the front panel. (Refer to 1)(2) Disconnect the connector from the vane motor.(3) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly.(4) Lifting the left side of the heat exchanger, remove the electrical box.(5) Remove the fixture of the fan motor.(6) Remove the hexagon socket set screws.(7) Remove the line flow fan and the fan motor.	<p>Photo 4</p>  <p>Fan motor catches</p> <p>Fan motor fixture</p> <p>Indoor coil thermistor</p>

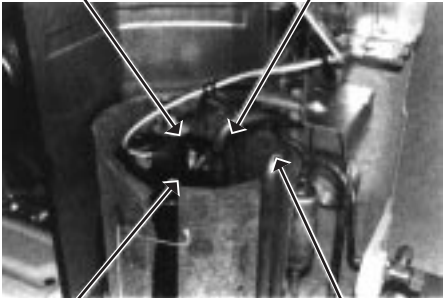
**11-2 MS-18NV -E1 MS-24NV -E1 MS-18NV -E2
MS-24NV -E2 MS-18NV -E3
INDOOR UNIT**

OPERATING PROCEDURE	PHOTOS
<p>1. Removing the front panel</p> <ol style="list-style-type: none"> (1) Remove the screws caps at the down of the front panel. Remove the screws. (2) Pull the panel down to your side slightly and unhook the catches at the top. 	<p>Photo 1</p> 
<p>2. Removing the electronic control P.C. board</p> <ol style="list-style-type: none"> (1) Remove the front panel. (Refer to 1) (2) Remove the electriccal cover. (3) Remove the screw, remove the terminal cover. (4) Remove the screw on the terminal block. (5) Unhook the catch of the lamp holder. (6) Remove the receiver holder. (7) Disconnect the connectors and the lead wire from 52C relay on the electronic control P.C. board and remove the ground and the indoor coil thermistor. (8) Remove the electronic control P.C. board. 	<p>Photo 2</p> 

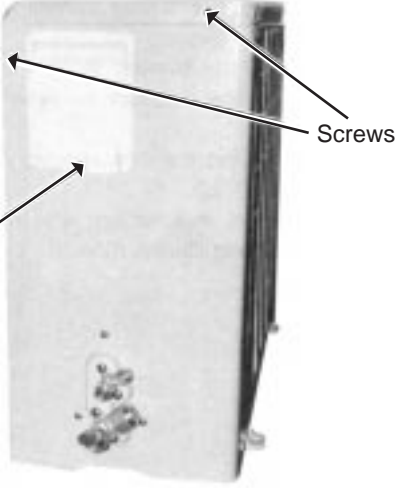
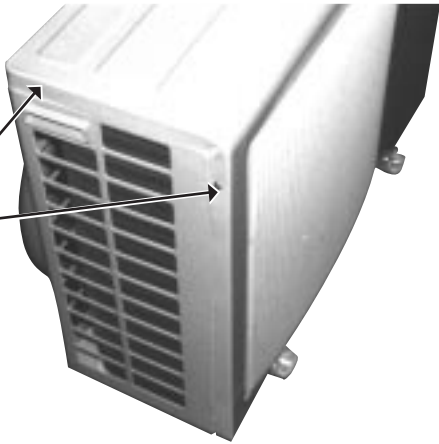
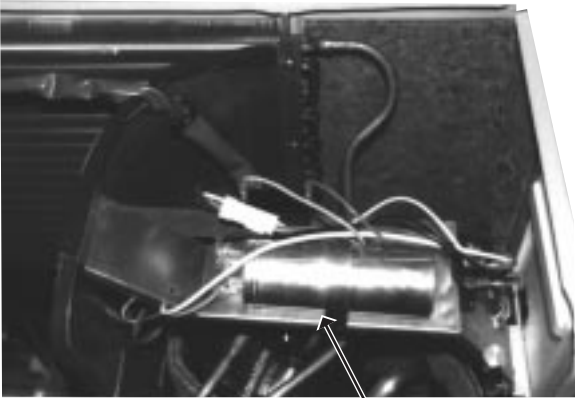
OPERATING PROCEDURE	PHOTOS
<p>3. Removing the electrical box</p> <ol style="list-style-type: none"> (1) Remove the front panel. (Refer to 1) (2) Remove the electrical cover. (3) Disconnect the connector of the indoor coil thermistor. (4) Disconnect the motor connector (CN211 and CN121) and the vane motor connector (CN151) on the electronic control P.C. board. (5) Remove the screw of the electrical box, remove the electrical box. 	<p>Photo 3</p> 
<p>4. Removing the indoor fan motor and the line flow fan</p> <ol style="list-style-type: none"> (1) Remove the front panel. (2) Remove the electrical box. (3) Unhook the catches on the both sides of the nozzle assembly. (4) Remove the nozzle assembly. (5) Remove the screws of the bearing support. (6) Remove the screw of the heat exchanger unhook the catch. (7) Lifting the heat exchanger, remove the bearing support. (8) Remove the motor support. (9) Loose the screw fixing the line flow fan, remove the line flow fan. (10) Remove the screws of the motor band, remove the fan motor. 	<p>Photo 3</p>  <p>Photo 4</p> 

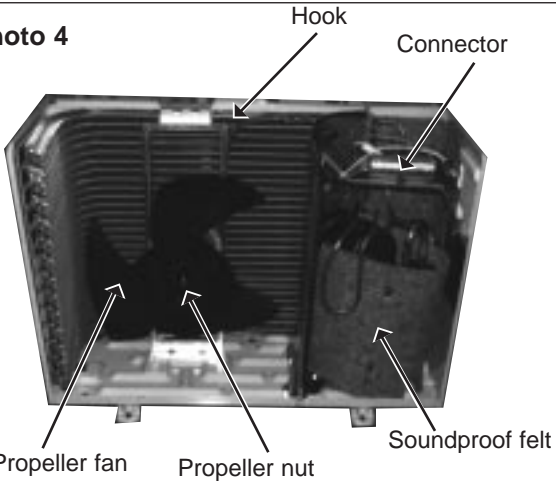
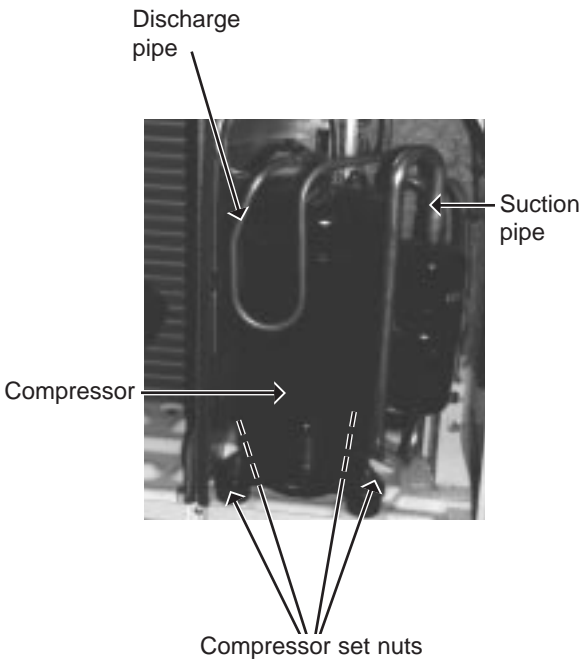
11-3 MU-07NV -E1 MU-09NV -E1 MU-07NV -E2 MU-09NV -E2 OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
<p>1. Removing the cabinet</p> <ol style="list-style-type: none"> (1) Remove screws securing the top panel. (2) Remove the screw securing the service panel. (3) Remove screws securing the cabinet. (4) Remove the service panel, and remove the screw from the insides. (5) Remove the top panel. (6) Remove the cabinet. 	<p>Photo 1</p>  <p>Screw for service panel Service panel Screw for top panel</p> <p>Screws for cabinet</p> <p>Photo 2</p>  <p>Screw for top panel</p> <p>Screw for cabinet</p>
<p>2. Removing the propeller fan and the outdoor fan motor</p> <ol style="list-style-type: none"> (1) Remove the cabinet. (Refer to 1) (2) Remove the propeller fan nuts. (3) Remove the propeller fan. <p>NOTE: Loosen the propeller fan in the rotating direction for removal.</p> <p>When attaching the propeller fan, align the mark on the propeller fan and the motor shaft cut section.</p> <p>Set the propeller fan in position by using the cut on the shaft and the mark on the propeller fan.</p> <ol style="list-style-type: none"> (4) Remove lead clamps and disconnect the outdoor fan motor lead wires. (5) Remove screws fixing the fan motor. (6) Remove the outdoor fan motor. 	<p>Photo 3</p>  <p>Set screws for outdoor fan motor Lead clamps</p> <p>Propeller fan</p> <p>Outdoor fan motor</p> <p>Propeller fan nut</p>

OPERATING PROCEDURE	PHOTOS
<p>3. Removing the compressor</p> <p>(1) Remove the lead clamps. (2) Remove the screws fixing the relay panel. (3) Remove the screw fixing the service port. (4) Remove the terminal cover. (5) Pull out the lead from the compressor terminal. (6) Remove the overcurrent relay. (7) Remove the compressor nuts. (8) Detach the suction pipe welded section and discharge pipe welded section with a burner.</p> <p>NOTE</p> <ul style="list-style-type: none">● Before using a burner, purge gas from the pipes until the pressure gauge shows 0 kg/cm².● Use the burner under the condition that gas can be released even when the inner pressure rises by heat.	<p>Photo 4</p> <p>Terminal cover Discharge pipe</p>  <p>compressor Suction pipe</p>

11-4 MU-12NV -E1 MU-18NV -E1 MU-24NV -E1 MU-12NV -E2
 MU-18NV -E2 MU-24NV -E2 MU-18NV -E3
 OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
<p>1. Removing the cabinet</p> <p>(1) Remove the screws of the cabinet.</p> <p>(2) Hold the bottom of the cabinet on the both side to remove the cabinet.</p>	<p>Photo 1</p>  <p>Screws</p> <p>Service panel</p> <p>Photo 2</p>  <p>Screws</p>
<p>2. Removing the electrical parts</p> <p>(1) Remove the service panel and the cabinet.</p> <p>(2) Remove the following parts.</p> <ul style="list-style-type: none"> •Compressor capacitor (C1) •Outdoor fan capacitor (C2) •Terminal block 	<p>Photo 3</p>  <p>Compressor capacitor</p>

OPERATING PROCEDURE	PHOTOS
<p>3. Removing the outdoor fan motor</p> <p>(1) Remove the cabinet. (Refer to 1)</p> <p>(2) Disconnect the connector remove the hooked lead wire from the fan motor.</p> <p>(3) Remove the propeller nut and remove the propeller.</p> <p>(4) Remove screws securing the fan motor.</p>	<p>Photo 4</p>  <p>Hook</p> <p>Connector</p> <p>Propeller fan</p> <p>Propeller nut</p> <p>Soundproof felt</p>
<p>4. Removing the compressor</p> <p>(1) Remove the cabinet. (Refer to 1)</p> <p>(2) Remove the soundproof felt.</p> <p>(3) Remove the terminal cover on the compressor</p> <p>(4) Disconnect lead wires from the glass terminal of the compressor.(Refer to 2)</p> <p>(5) Release gas from the refrigerant circuit.</p> <p>(6) Disconnect the welded part of the discharge pipe.</p> <p>(7) Disconnect the welded part of the suction pipe.</p> <p>(8) Remove nuts fixing the compressor.</p> <p>(9) Remove the compressor.</p>	<p>Photo 5</p>  <p>Discharge pipe</p> <p>Suction pipe</p> <p>Compressor</p> <p>Compressor set nuts</p>

INDOOR UNIT

STRUCTURAL PARTS

MS-07NV -E1 (WH)

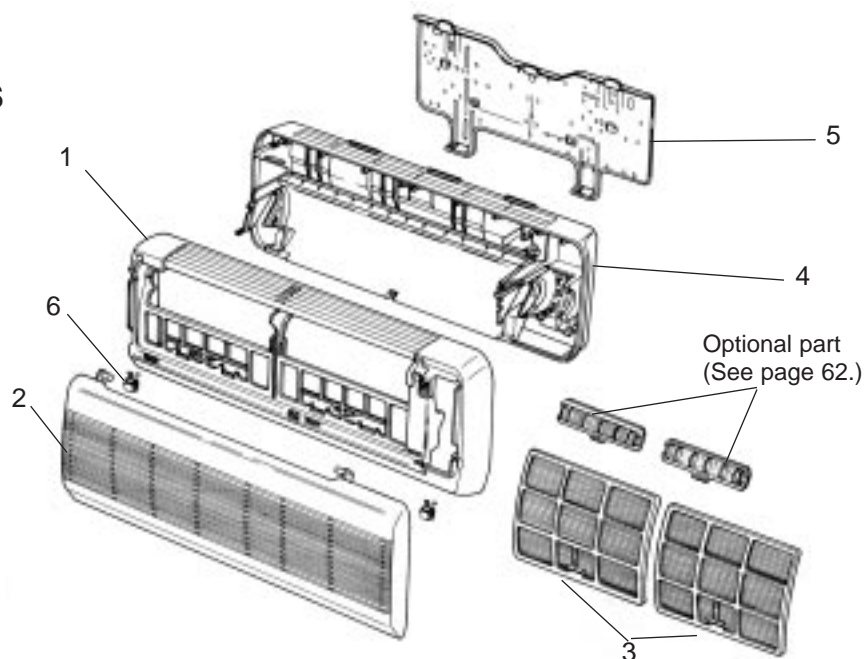
MS-09NV -E1 (WH)

MS-12NV -E1 (WH)

MS-07NV -E2 (WH)

MS-09NV -E2 (WH)

MS-12NV -E2 (WH)



NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit						Remarks
				MS-07NV-E1 (WH)	MS-07NV-E2 (WH)	MS-09NV-E1 (WH)	MS-09NV-E2 (WH)	MS-12NV-E1 (WH)	MS-12NV-E2 (WH)	
1	E02 202 000	FRONT PANEL(WH)		1	1					
	E02 158 000	FRONT PANEL(WH)				1	1			
	E02 160 000	FRONT PANEL(WH)						1	1	
2	E02 151 010	GRILLE(WH)		1	1	1	1	1	1	
3	E02 164 100	AIR FILTER		2	2	2	2	2	2	1PC/SET
4	E02 151 234	BOX(WH)		1		1		1		
	E02 166 234	BOX(WH)			1		1		1	
5	E02 151 970	INSTALLATION PLATE		1	1	1	1	1	1	2PCS/SET
6	E02 166 067	SCREW CAP(WH)		2	2	2	2	2	2	

INDOOR UNIT

HEAT EXCHANGER

MS-07NV -E1 (WH)

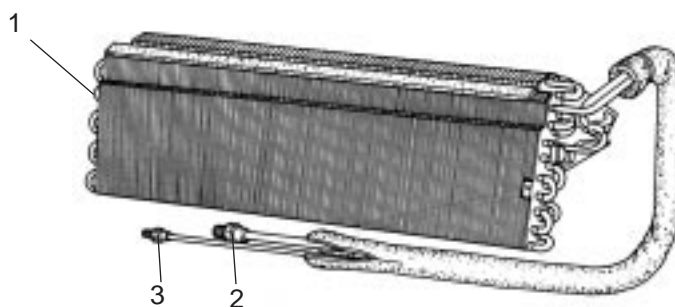
MS-09NV -E1 (WH)

MS-12NV -E1 (WH)

MS-07NV -E2 (WH)

MS-09NV -E2 (WH)

MS-12NV -E2 (WH)



NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MS-07/09NV- (WH)	MS-12NV- (WH)	
1	E02 151 620	INDOOR HEAT EXCHANGER		1		
	E02 155 620	INDOOR HEAT EXCHANGER			1	
2	E02 151 666	UNION(GAS)		1		φ9.52
	E02 155 666	UNION(GAS)			1	φ12.7
3	E02 151 667	UNION(LIQUID)		1	1	φ6.35

INDOOR UNIT

ELECTRICAL PARTS

MS-07NV -E1 (WH)

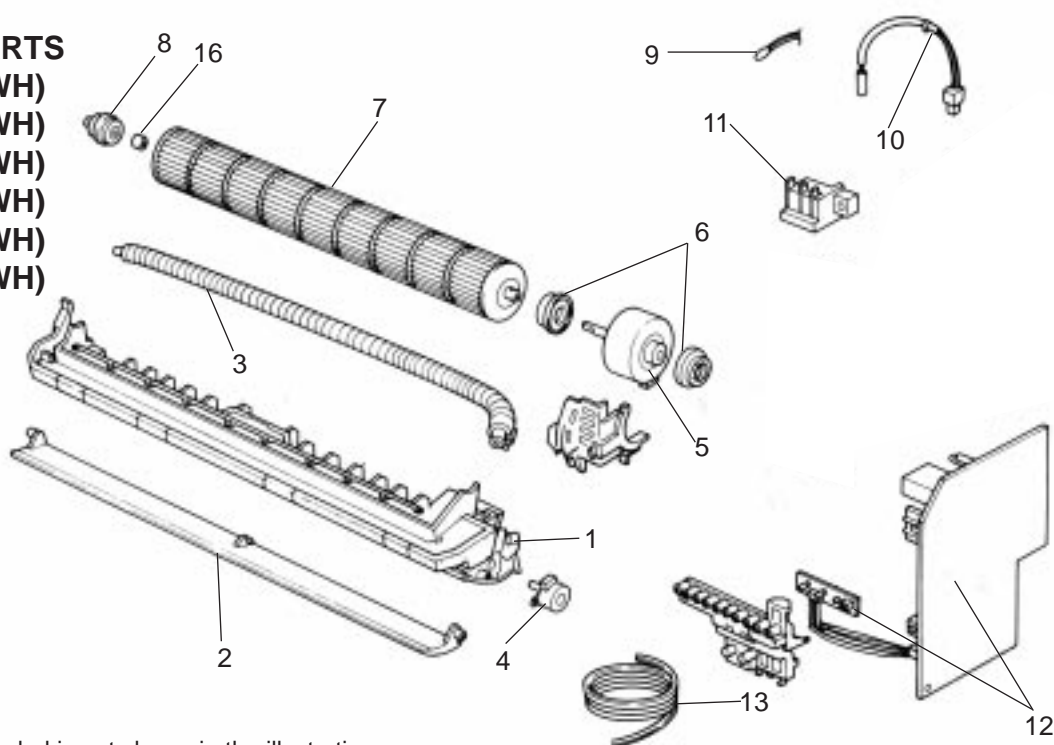
MS-09NV -E1 (WH)

MS-12NV -E1 (WH)

MS-07NV -E2 (WH)

MS-09NV -E2 (WH)

MS-12NV -E2 (WH)



Part number that are circled is not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit			Remarks
				MS-07NV- <u>E1</u> <u>E2</u> (WH)	MS-09NV- <u>E1</u> <u>E2</u> (WH)	MS-12NV- <u>E1</u> <u>E2</u> (WH)	
1	E02 166 235	NOZZLE(WH)		1	1	1	
2	E02 166 040	VANE(WH)		1	1	1	
3	E02 141 702	DRAIN HOSE		1	1	1	
4	E02 151 303	VANE MOTOR	MV	1	1	1	
5	E02 151 300	INDOOR FAN MOTOR	MF	1	1	1	RC4V19-□□
6	E02 151 505	RUBBER MOUNT		2	2	2	2PCS/SET
7	E02 151 302	LINE FLOW FAN		1	1	1	
8	E02 151 509	BEARING MOUNT		1	1	1	
9	E02 151 308	ROOM TEMPERATURE THERMISTOR	RT11	1	1	1	
10	E02 151 307	INDOOR COIL THERMISTOR	RT12	1	1	1	
11	E02 197 375	TERMINAL BLOCK	TB	1	1	1	
12	E02 202 450	ELECT CONTROL P.C.BOARD		1	1		
	E02 204 450	ELECT CONTROL P.C.BOARD				1	
13	E02 152 395	POWER SUPPLY CORD		1	1	1	
⑭	E02 127 382	FUSE	F11	1	1	1	3.15A
⑮	E02 085 385	VARISTOR	NR11	1	1	1	
16	E02 001 504	SLEEVE BEARING		1	1	1	
⑰	E02 151 468	RECEIVER		1	1	1	
⑱	E02 199 520	FAN GUARD		1	1	1	

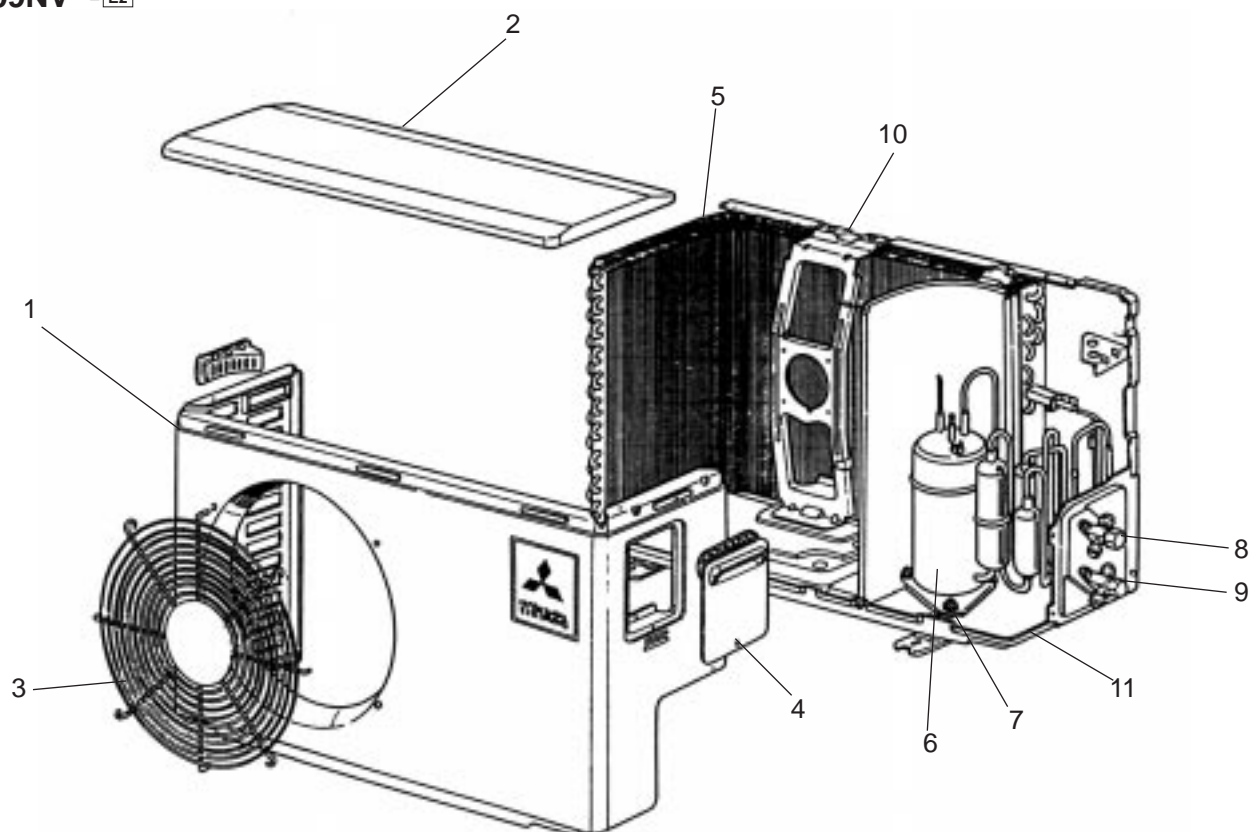
OUTDOOR UNIT STRUCTURAL PARTS

MU-07NV - E1

MU-09NV - E1

MU-07NV - E2

MU-09NV - E2



Part number that are circled is not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MU-07NV - E1 MU-07NV - E2	MU-09NV - E1 MU-09NV - E2	
1	E02 096 232	CABINET		1	1	
2	E02 085 297	TOP PANEL		1	1	
3	E02 199 521	FAN GUARD		1	1	
4	E02 085 245	SERVICE PANEL		1	1	
5	E02 085 630	OUTDOOR HEAT EXCHANGER		1	1	
6	E02 127 900	COMPRESSOR	MC		1	RH-145VGHT
	E02 164 900	COMPRESSOR	MC	1		RH-135VGHT
7	E02 047 506	COMPRESSOR RUBBER SET		3	3	
8	E02 096 662	STOP VALVE(LIQUID)		1	1	φ 6.35
9	E02 096 661	STOP VALVE(GAS)		1	1	φ 9.52
10	E02 085 515	MOTOR SUPPORT		1	1	
11	E02 127 290	BASE		1	1	
12	E02 158 936	CAPILLARY TUBE		1	1	φ3.0 X φ1.6 X 1200

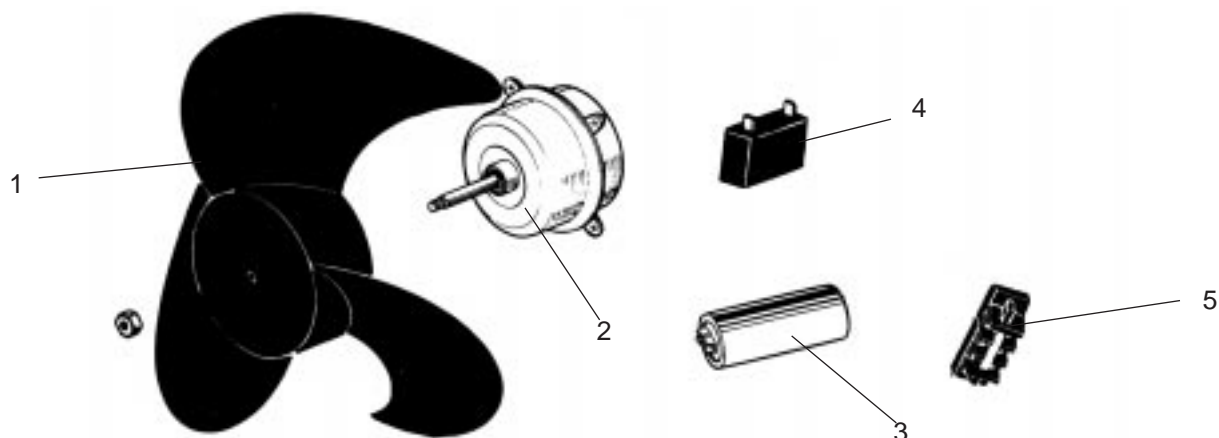
OUTDOOR UNIT FUNCTIONAL PARTS AND ELECTRICAL PARTS

MU-07NV -E1

MU-09NV -E1

MU-07NV -E2

MU-09NV -E2

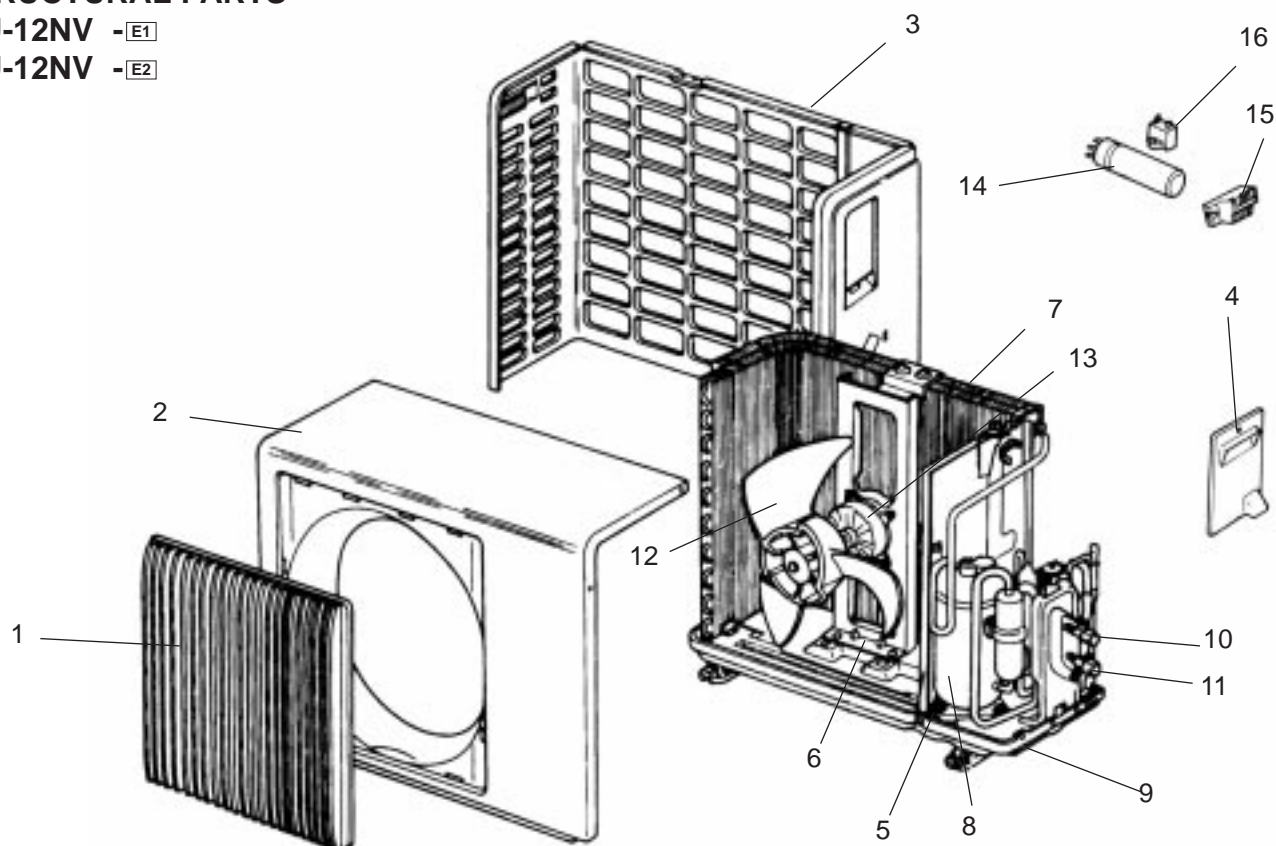


NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MU-07NV- MU-09NV-	E1 E2 E1 E2	
1	E02 085 501	PROPELLER FAN		1		
2	E02 085 301	OUTDOOR FAN MOTOR	MF	1		RA6V23-□□
3	E02 085 353	COMPRESSOR CAPACITOR	C1	1		25 μ F/440VAC
4	E02 002 350	OUTDOOR FAN CAPACITOR	C2	1		1.5 μ F/440VAC
5	E02 202 374	TERMINAL BLOCK	TB	1		

OUTDOOR UNIT STRUCTURAL PARTS

MU-12NV -E1

MU-12NV -E2



Part number that are circled is not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MU-12NV- E1	MU-12NV- E2	
1	E02 141 521	GRILLE		1	1	
2	E02 141 232	CABINET ASSEMBLY		1	1	
3	E02 140 233	BACK PANEL		1	1	
4	E02 141 245	SERVICE PANEL		1	1	
5	E02 075 506	COMPRESSOR RUBBER SET		3	3	
6	E02 140 515	MOTOR SUPPORT		1	1	
7	E02 141 630	OUTDOOR HEAT EXCHANGER		1	1	
8	E02 141 900	COMPRESSOR	MC	1	1	RH-231VHAT
9	E02 140 290	BASE		1	1	
10	E02 139 662	STOP VALVE(LOQUID)		1	1	φ 6.35
11	E02 140 661	STOP VALVE(GAS)		1	1	φ 12.7
12	E02 141 501	PROPELLER FAN		1	1	
13	E02 141 301	OUTDOOR FAN MOTOR	MF	1	1	RA6V40 - □□
14	E02 079 353	COMPRESSOR CAPACITOR	C1	1	1	30μF/440VAC
15	E02 204 374	TEAMINAL BLOCK	TB	1	1	
16	E02 138 351	OUTDOOR FAN CAPACITOR	C2	1	1	3.0MFD/440VAC
①⑦	E02 140 936	CAPILLARY TUBE		1	1	φ3.0Xφ1.8X800

INDOOR UNIT STRUCTURAL PARTS

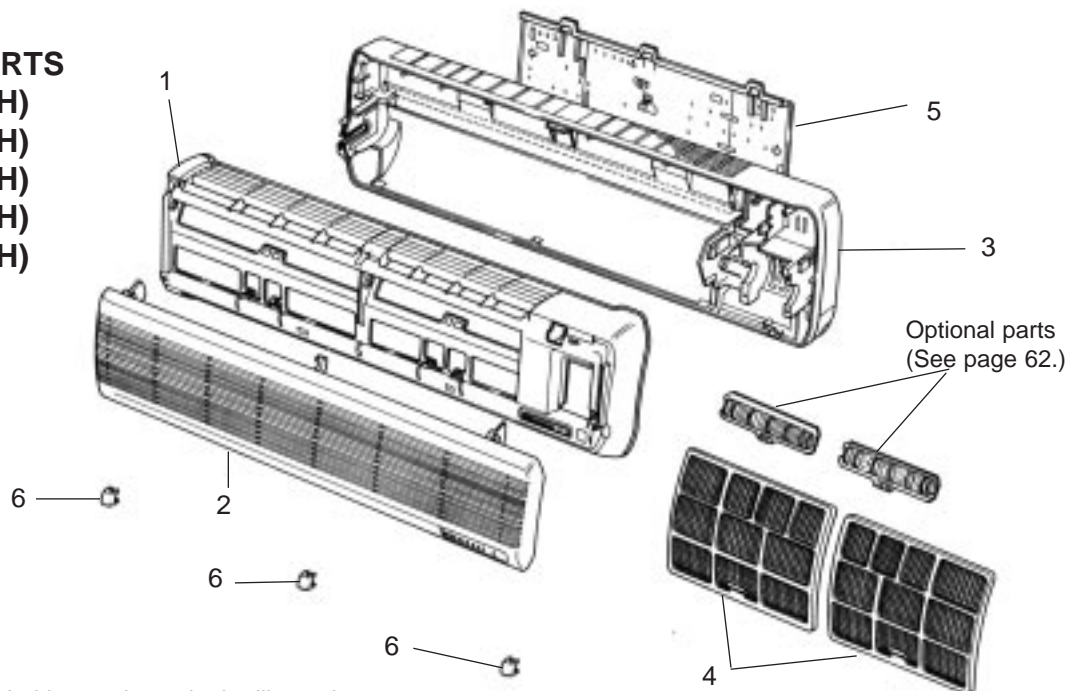
MS-18NV -**E1** (WH)

MS-24NV -**E1** (WH)

MS-18NV -**E2** (WH)

MS-24NV -**E2** (WH)

MS-18NV -**E3** (WH)



Part number that are circled is not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MS-18NV- E1 E2 E3 (WH)	MS-24NV- E1 E2 (WH)	
1	E02 138 000	FRONT PANEL (WH)		1	1	
2	E02 138 010	GRILLE (WH)		1	1	
3	E02 143 234	BOX (WH)		1	1	
4	E02 141 100	AIR FILTER		2	2	1PC/SET
5	E02 141 970	INSTALLATION PLATE		1	1	
6	E02 143 067	SCREW CAP (WH)		3	3	3PCS/SET
⑦	E02 171 007	LAMP PANEL (WH)		1		
	E02 176 007	LAMP PANEL (WH)			1	

INDOOR UNIT HEAT EXCHANGER PARTS

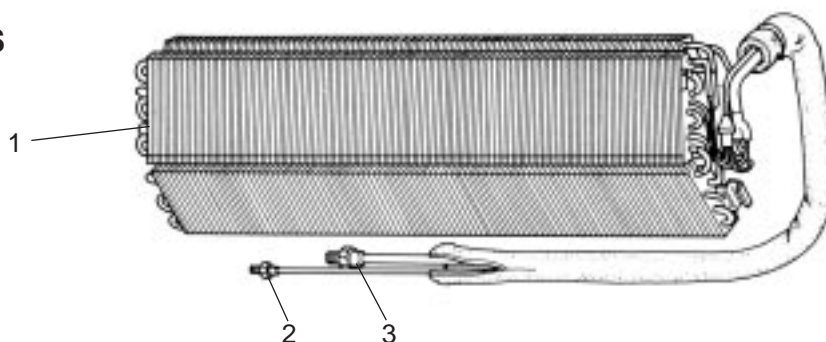
MS-18NV -**E1** (WH)

MS-24NV -**E1** (WH)

MS-18NV -**E2** (WH)

MS-24NV -**E2** (WH)

MS-18NV -**E3** (WH)



NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MS-18NV - E1 E2 E3 (WH)	MS-24NV - E1 E2 (WH)	
1	E02 141 620	INDOOR HEAT EXCHANGER		1	1	
2	E02 138 667	UNION(LIQUID)		1		φ6.35
	E02 176 667	UNION(LIQUID)			1	φ9.52
3	E02 138 666	UNION(GAS)		1	1	φ15.88

INDOOR UNIT ELECTRICAL PARTS

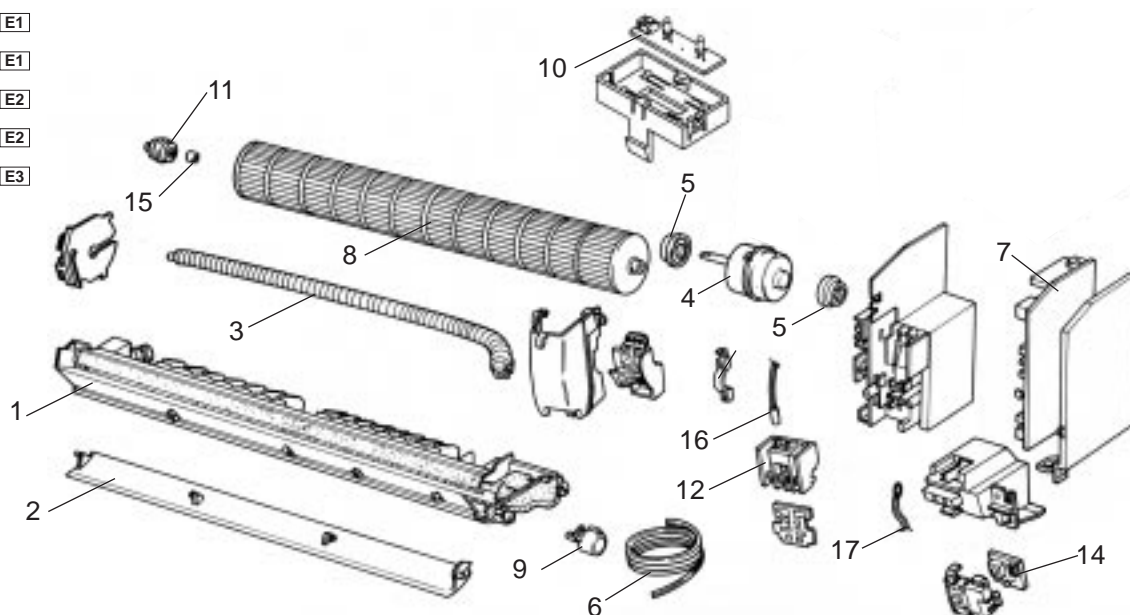
MS-18NV -E1

MS-24NV -E1

MS-18NV -E2

MS-24NV -E2

MS-18NV -E3



Part number that are circled is not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit				Remarks
				MS-18NV- E1 (WH)	MS-18NV- E2 E3 (WH)	MS-24NV- E1 (WH)	MS-24NV- E2 (WH)	
1	E02 143 235	NOZZLE (WH)		1	1	1	1	
2	E02 143 040	VANE (WH)		1	1	1	1	
3	E02 141 702	DRAIN HOSE		1	1	1	1	
4	E02 141 300	INDOOR FAN MOTOR	MF	1	1			RA4V27 -EA
	E02 213 300	INDOOR FAN MOTOR	MF			1	1	RA4V27 -EC
5	E02 001 505	RUBBER MOUNT		2	2	2	2	2PCS/SET
6	E02 138 395	POWER SUPPLY CORD		1	1			
	E02 147 395	POWER SUPPLY CORD				1		
	E02 320 395	POWER SUPPLY CORD					1	
7	E02 138 450	ELECT CONTROL P.C. BOARD		1				
	E02 213 450	ELECT CONTROL P.C. BOARD				1	1	
	E02 197 450	ELECT CONTROL P.C. BOARD			1			
8	E02 141 302	LINE FLOW FAN		1	1	1	1	
9	E02 141 303	VANE MOTOR	MV	1	1	1	1	
10	E02 138 329	DISPLAY P.C. BOARD		1	1	1	1	
11	E02 141 509	BEARING MOUNT		1	1	1	1	
12	E02 138 375	TERMINAL BLOCK	TB	1				
	E02 209 375	TERMINAL BLOCK	TB			1	1	
	E02 197 375	TERMINAL BLOCK	TB		1			
13	E02 085 385	VARISTOR	NR11	1	1	1	1	
14	E02 141 468	RECEIVER P. C. BOARD		1	1	1	1	
15	E02 001 504	SLEEVE BEARING		1	1	1	1	
16	E02 138 307	INDOOR COIL THERMISTOR	RT12	1	1	1	1	
17	E02 138 308	ROOM TEMPERATURE THERMISTOR	RT11	1	1	1	1	
18	E02 127 382	FUSE	F11	1	1	1	1	3.15A
19	E02 138 520	FAN GUARD		1	1	1	1	

OUTDOOR UNIT STRUCTURAL PARTS

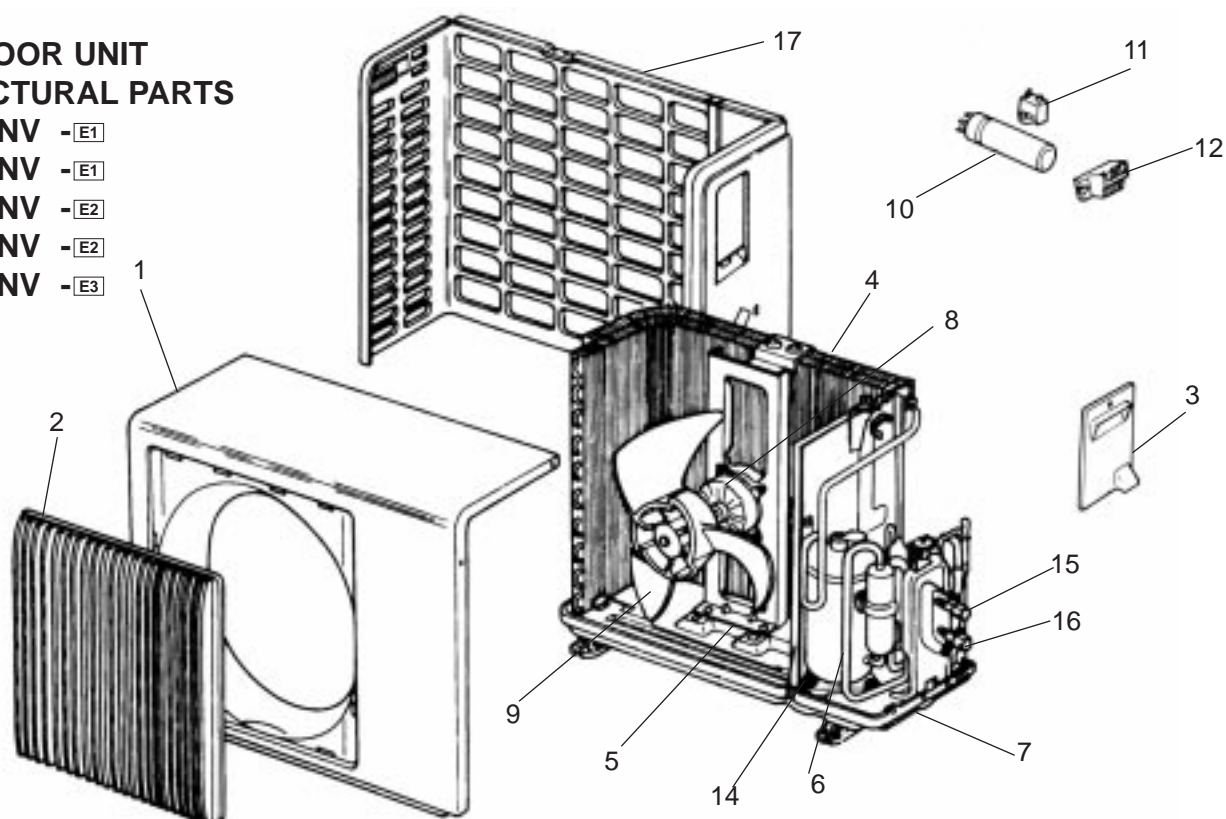
MU-18NV -E1

MU-24NV -E1

MU-18NV -E2

MU-24NV -E2

MU-18NV -E3

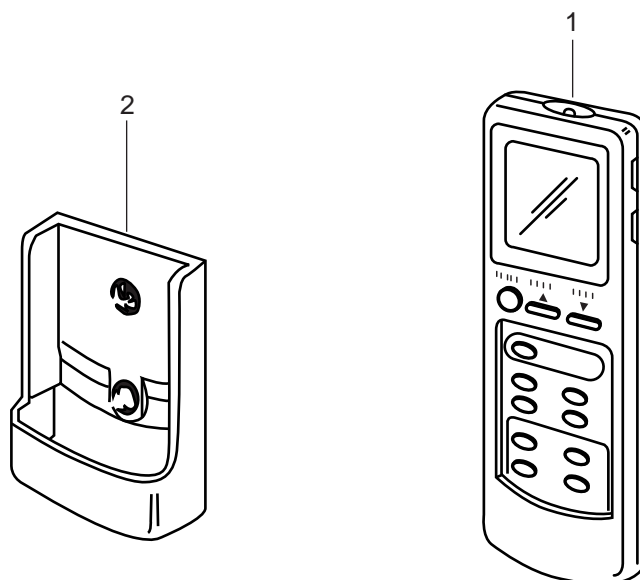


Part number that are circled is not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit				Remarks
				MU-18NV -E1	MU-18NV -E2 E3	MU-24NV -E1	MU-24NV -E2	
1	E02 141 232	CABINET		1	1	1	1	
2	E02 141 521	GRILLE		1	1	1	1	
3	E02 141 245	SERVICE PANEL		1	1	1	1	
4	E02 138 630	OUTDOOR HEAT EXCHANGER		1	1			
	E02 147 630	OUTDOOR HEAT EXCHANGER				1	1	
5	E02 138 515	MOTOR SUPPORT		1	1			
	E02 139 515	MOTOR SUPPORT				1	1	
6	E02 138 900	COMPRESSOR	MC	1	1			NH-33VMDT
	E02 042 900	COMPRESSOR	MC			1	1	NH-47VMDT
7	E02 138 290	BASE		1	1			
	E02 176 290	BASE				1	1	
8	E02 144 301	OUTDOOR FAN MOTOR	MF	1	1			RA6V50 - □ □
	E02 147 301	OUTDOOR FAN MOTOR	MF			1	1	RA6V60 - □ □
9	E02 141 501	PROPELLER FAN		1	1	1	1	
10	E02 144 353	COMPRESSOR CAPACITOR	C1	1	1			45μF/440V
	E02 082 353	COMPRESSOR CAPACITOR	C1			1	1	50μF/440V
11	E02 138 351	OUTDOOR FAN CAPACITOR	C2	1	1	1	1	3.0μF/440V
	E02 141 374	TERMINAL BLOCK	TB	1				
12	E02 197 374	TERMINAL BLOCK	TB		1			
	E02 209 374	TERMINAL BLOCK	TB			1	1	
13	E02 138 936	CAPILLARY TUBE		1	1	1	1	φ3.0Xφ2.0X700
	E02 176 936	CAPILLARY TUBE				1	1	φ3.0Xφ1.6X350
14	E02 138 506	COMPRESSOR RUBBER SET		4	4	4	4	
15	E02 139 662	STOP VALVE(LIQUID)		1	1			φ 6.35
	E02 176 662	STOP VALVE(LIQUID)				1	1	φ 9.52
16	E02 150 661	STOP VALVE(GAS)		1	1	1	1	φ15.88
17	E02 140 233	BACK PANEL		1	1	1	1	
18	E02 010 342	COMPRESSOR CONTACTOR	52C			1	1	
19	E02 229 381	THERMAL REED SWITCH					1	
20	E02 288 343	FAN MOTOR RELAY					1	

ACCESSORY AND REMOTE CONTROLLER PARTS

MS-07NV -**E1** (WH)
 MS-09NV -**E1** (WH)
 MS-12NV -**E1** (WH)
 MS-18NV -**E1** (WH)
 MS-24NV -**E1** (WH)
 MS-07NV -**E2** (WH)
 MS-09NV -**E2** (WH)
 MS-12NV -**E2** (WH)
 MS-18NV -**E2** (WH)
 MS-24NV -**E2** (WH)
 MS-18NV -**E3** (WH)



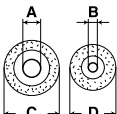
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MS-07/09/12/18/24NV- E1 MS-18NV - E3 MS-07/09/12/18/24NV- E2 (WH)	
1	E02 138 426	REMOTE CONTROLLER		1	
2	E02 141 083	REMOTE CONTROLLER HOLDER		1	

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OPTIONAL PARTS

1. REFRIGERANT PIPES

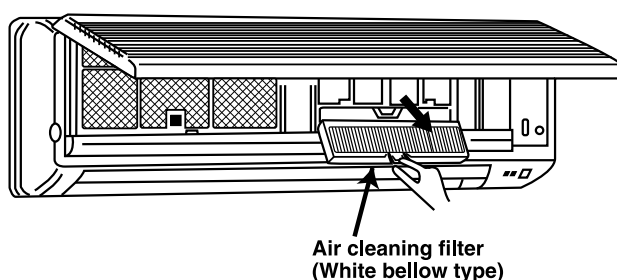
The air conditioner has flared connections its indoor and outdoor sides.
Please use the optional extension pipe as follows.

Model	Part No.	Pipe length	Pipe size O.D mm (in.)				Additional refrigerant charge R-22 (g)				
			Cross-section	A-Gas	B-Liquid	Insulation					
						C		D			
MS-07NV- E1	MAC-440PI	3m		9.52 (3/8)	6.35 (1/4)	27	21	0			
MS-09NV- E1	MAC-441PI	5m						45			
MS-07NV- E2	MAC-442PI	7m						0			
MS-09NV- E2	MAC-443PI	10m						45			
MS-12NV- E1	MAC-660PI	3m		12.7 (1/2)		31	27	0			
	MAC-661PI	5m						45			
	MAC-662PI	7m						120			
	MAC-663PI	10m						0			
	MAC-664PI	15m						45			
MS-18NV- E1	MAC-670PI	3m		15.88 (5/8)	9.52 (3/8)			120			
	MAC-671PI	5m						0			
	MAC-672PI	7m						45			
	MAC-673PI	10m						120			
MS-18NV- E2	MAC-674PI	15m						0			
MS-24NV- E1	MAC-860PIE	3m						9.52 (3/8)	45		
	MAC-861PIE	5m							120		
	MAC-862PIE	7m							0		
	MAC-863PIE	10m							45		
	MAC-864PIE	15m							120		

2. AIR CLEANING FILTER

- AIR CLEANING FILTER removes fine dust of 0.01 micron from air by means of static electricity.
- Normal life of AIR CLEANING FILTER is 3 months. However, when it becomes dirty, replace it as soon as possible.
- Clogged AIR CLEANING FILTER may reduce the air conditioner capacity or cause frost on the air outlet.
- DO NOT reuse AIR CLEANING FILTER even if it is washed.
- DO NOT remove or attach AIR CLEANING FILTER during unit operation.

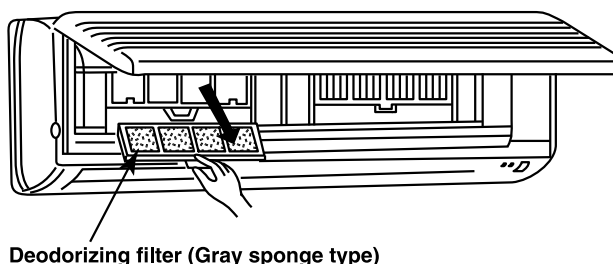
Model	Part No.
MS-07NV - [E1] [E2] , MS-09NV - [E1] [E2] , MS-12NV - [E1] [E2]	MAC-1000FT
MS-18NV - [E1] [E2] [E3] , MS-24NV - [E1] [E2]	MAC-1100FT



3. DEODORIZING FILTER

- DEODORIZING FILTER removes ammonia and hydrogen sulphide emitted from tobacco, and odors of pets.
 - Clean DEODORIZING FILTER every two weeks. If the filter is particularly dirty, clean the filter more often.
 - For cleaning, soak the filter in warm water for a while, and then wash and rinse it. Dry the filter in the shade thoroughly.
 - When the filter color is still dark even after cleaning, replace the filter with a new one.
- Replace the filter at least once a year.

Model	Part No.
MS-07NV - [E1] [E2] , MS-09NV - [E1] [E2] , MS-12NV - [E1] [E2]	MAC-1500DF
MS-18NV - [E1] [E2] [E3] , MS-24NV - [E1] [E2]	MAC-1600DF



- DEODORIZING FILTER and AIR CLEANING FILTER can be attached on either side.



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